

8. Appendices:

A. The samples are arranged according to period, type, site, and traditional archaeological diagnosis of the Early Islamic assemblage.

Sample. no.	Surface Treatments	Ware	Color	Firing cond.	Type	Date
UJ231		coarse Terracotta	6/6 2.5YR light red	ox.	rim	Um.
UJ318		cooking pot	4/2 5YR dark reddish gray	ox.	handle	Um
UJ321	brown slip	gray ware	4/1 5YR dark gray	red.	B. sherd	Um
UJ322		coarse Terracotta	5/4 5YR reddish brown	ox.	B. sherd	Um
UJ326		cream ware	7/3 10YR very pale brown	ox.	B. sherd	Um
UJ340		coarse Terracotta	6/3 2.5YR light reddish brown	ox.	B. sherd	Um
UJ343	ripping	fine Terracotta	6/4 2.5YR light reddish brown	ox.	B. sherd	Um
UJ562	ripping, cream slip	biscuit ware	6/4 7.5YR reddish yellow	ox.	B. sherd	Um
UJ610		biscuit ware	6/4 5.5YR light reddish brown	ox.	rim	Um
UJ612	cream slip	coarse Terracotta	6/4 5YR light reddish brown	ox.	B. sherd	Um
UJ616	red paint above cream slip	Painted ware	ext. 6/4 5.5YR light reddish brown int. 6/1 5YR gray	ox.	B. sherd	Um
UJ617		fine Terracotta	4/6 5YR yellowish red	ox.	B. sherd	Um
UJ622		coarse Terracotta	5/4 2.5YR reddish brown	ox.	B. sherd	Um
UJ692		biscuit ware	6/2 2.5YR light reddish brown	ox.	B. sherd	L.byz, E. Um
UJ699	wavy graving	biscuit ware	6/2 7.5YR pinkish gray	ox.	B. sherd	Um
UJ701	red paint, graving	red paint ware	6/3 7.5YR light brown	ox.	B. sherd	Um

UJ703		cooking pot	4/3 7.5YR brown	red.	B. sherd	Um
UJ705	cutting	gray cut ware	6/1 10YR gray	red.	B. sherd	Abb.
UJ711		coarse Terracotta	5/6 5YR yellowish red	ox.	B. sherd	Um
UJ759	wavy grave	fine buff ware	7/6 7.5YR light red	ox.	B. sherd	Um
UJ776		fine buff ware	5/4 2.5YR reddish brown	ox.	B. sherd	Um
UJ848		coarse terracotta	6/8 7.5YR light red	ox.	B. sherd	Um
UJ855		gray ware	4/5PB gley2 dark bluish gray	red.	B. sherd	Um
UJ891		coarse Terracotta	6/6 2.5YR light red	ox.	B. sherd	L.Ro, E.Byz
UJ895	slip	biscuit ware	5/2 5YR reddish gray	ox.	B. sherd	Um
UJ917	ripping	gray ware	5/2 5YR reddish gray	ox.	B. sherd	Um
UJ920		Coarse terracotta	6/4 2.5YR light reddish brown	ox.	B. sherd	Um
UJ940	ripping	cream ware	8/3 10YR very pale brown	ox.	B. sherd	Abbasi d
UJ961	sh. ripping, L. brownish slip	cooking pot	4/2 7.5YR brown	ox.	B. sherd	L.BYZ, E.UM
UJ977	cut graving	cut ware	5/6 5YR yellowish red	ox.	B. sherd	Abb.
UJ1001	ripping	gray ware	5/10 B gley 2	red.	B. sherd	Um
UJ1009	wavy engraving	gray ware	5/5B gley 2	red.	B. sherd	Um
UJ1023		biscuit ware	5/2 7.5YR brown	ox.	B. sherd	Um
UJ1023		biscuit ware	5/2 7.5YR brown	ox.	B. sherd	Um
UJ1024		coarse terracotta	5/6 7.5YR strong brown	ox.	B. sherd	Um
UJ1024		Coarse terracotta	5/6 7.5YR strong brown	ox.	B. sherd	Um
UJ991	cream slip, brown paint	painting ware	7/3 7.5YR pink	ox.	B. sherd	Um
UJ1093	cream slip	coarse ware	5/3 7.5YR brown	ox.	B. sherd	Um
UJ1110		coarse cream	7/4 7.5YR pink	ox.	B. sherd	Um
UJ1111		coarse ware	5/6 5YR yellowish red	ox.	B. sherd	Um

UJ83		coarse terracotta	6/4 7.5YR light brown	ox.	B. sherd	Um.
UJ84		cooking pot	6/3 7.5YR light brown	ox.	casserole	L.Byz, Um
UJ.85		fine Terracotta	6/4 5YR light reddish brown	ox.	handle	Um.
UJ95		cooking pot	4/1 5YR dark gray	ox.	B. sherd	Um.
UJ.96	ripping	cooking pot	7/4 5YR reddish yellow	ox.	lid	Um.
UJ.88	ripping	cooking pot	5/4 5.5YR reddish brown	ox.	B. sherd	Um.
UJ89		biscuit ware	6/3 7.5YR light brown	ox.	B. sherd	Um.
UJ94	ripping	cooking pot	5/1 7.5YR gray	ox.	B. sherd	Um.
UJ110		fine terracotta	4/6 5YR yellowish red	ox.	B. sherd	Um.
UJ146		table ware	5/6 10YR red	ox.	Juglet body	Um.
UJ151		Coarse terracotta	4/3 2.5YR reddish brown	ox.	bowl rim	Um.
UJ158		Coarse terracotta	4/8 10YR red	ox.	bowl rim	Um.
AB207		Coarse terracotta	6/8 2.5YR light red	ox.	h. mouth jar rim	Um.
AB168		Coarse terracotta	3/4 2.5 YR reddish brown	ox.	Jar B. sherd	Um.
HM.p38 1	Incised wave deco.	gray ware	5/5B gley 2	red.	jar B. sherd	Um.
AB272		pinkish ware	7/4 7.5YR pink	ox.	handle	Um.
AB277		pinkish ware	7/4 7.5YR pink	ox.	jar base	Um.
AB126		fine Terracotta	5/8 2.5YR red	ox.	jar (handle)	LByz/ Um.
AB259		cream ware	8/3 10YR very pale brown	ox.	jar neck	Um.
AB531	sl-p'd (red-on-red)	painting ware	7/3 7.5YR pink	ox.	jar body sherd	Um./ Abb.
AB90	self-slip	fine Terracotta	4/3 5YR yellowish red	ox.	jar rim	LByz/ Um.
AB667		fine Terracotta	3/4 5YR reddish brown	ox.	jar rim	Um. / Abb.
AB85	sl-p'd (bl.-on-red)	fine Terracotta	4/4 5YR reddish brown	ox.	jar rim	Um. / Abb
AB397	red paint above cream slip	red paint ware	6/3 7.5YR light brown	ox.	B. sherd	?

AB253	Kerbschnitt	Grey-ware cut ware	5/5B gley 2	red.	basin rim	Um.
AB665	sl-p'd? (bl-on-white)	sliped ware	7/3 7.5YR pink	ox.	B. sherd	Um.
AB243		Coarse terracotta	6/4 5YR light reddish brown	ox.	B. sherd	LByz/ Um.
AB104	black painted	Coarse terracotta	4/8 2.5YR red	ox.	B. sherd	LByz/ Um.
AB668	mono-gl'd turquoise	Frit-ware	8/2 10YR white	ox.	B. sherd	Um./ Abb.
AB164		Grey-ware		red.	large jar	LByz/ Um.
UQ20		pinkish ware	7/4 5YR pink	ox.	handle	Um.
UQ127	brown slip	fine Terracotta	6/2 10YR light brownish gray	ox.	B. sherd	Um.
UQ163	black paint	fine Terracotta	8/2 2.5YR pinkish white	ox.	B. sherd	Um.

B: The samples are arranged according to period, type, site, and traditional archaeological diagnosis for the Middle Islamic assemblage.

sample Number	Surface Treatments	Ware	Color	Firing cond.	Type	Date
AB86	geometric paint	coarse terracotta	5/6 5YR yellowish red	ox.	handle	MIS
AB87	green mono-gl'd	Glazed Ware	7/4 10YR very pale brown	ox.	cup base	MIS
AB106	yellow and brown glaze	Slipped-Ware	7/4 10YR pale red	ox.	B. sherd	MIS
AB130	green mono-gl'd	Glazed Ware	6/8 10YR light red	ox.	bowl (high footed)	MIS
AB172		coarse terracotta	8/2 5YR pinkish white	ox.	jar (handle)	MIS
AB174	(y. gl'd, gr. stain)	champlevé	7/3 5YR pink	ox.	bowl B.sherd	MIS
AB199	geometric paint	coarse terracotta	4/8 10R red	ox.	jar (handle)	MIS
AB267	geometric paint	coarse terracotta	3/6 10R dark red	ox.	large jar (handle)	MIS
AB431	mono-gl'd (gr.)	Glazed Ware	5/6 2.5YR red	ox.	bowl rim	MIS
AB482	stain-gl'd (gr.-in-	Glazed Ware	6/8 2.5YR light red	ox.	bowl	MIS

	yell.)				B.sherd	
AB488	mono-gl'd (gr.)	Glazed Ware	7/4 10R pale red	ox.	bowl B.sherd	MIS
AB506	bi-chrome gl.	Glazed Ware	7/6 2.5YR light red	ox.	bowl B.sherd	MIS
AB511	stain-gl'd (gr.-in-pale y.)	Glazed Ware	4/8 2.5YR red	ox.	bowl base	MIS
AB571	mono-gl'd (gr.)	Glazed Ware	4/6 10R red	ox.	bowl	MIS
AB616	geometric paint	fine terracotta	3/6 10R dark red	ox.	jar B. sherd	MIS
AB650	geometric paint	coarse terracotta	5/8 10R red	ox.	jar B. sherd	MIS
AB701	brown yellow slip	fine terracotta	4/8 10R red	ox.	bowl B.sherd	MIS
AB776	geometric paint	coarse terracotta	3/6 10R dark red	ox.	jar (neck)	MIS
HM.P227	geometric paint	coarse terracotta	7/8 10R light red	ox.	B. sherd	MIS
TU18	geometric paint	coarse terracotta	5/1 2.5YR reddish gray	red.	B. sherd	MIS
UQ4	green mono-gl'd	Glazed Ware	8/2 5YR pinkish white	ox.	base	MIS
UQ15	bi-chrome gl.	Glazed Ware	4/8 2.5YR dark red	ox.	rim	MIS
UQ17		coarse terracotta	8/3 2.5YR pink	ox.	B. sherd	MIS
UQ29	bi-chrome gl.	Glazed Ware	8/3 2.5YR pink	ox.	B. sherd	MIS
UQ45	mono-gl'd (gr.)	Glazed Ware	8/4 2.5YR pink	ox.	base	MIS
UQ77	geometric paint	coarse terracotta	8/2 7.5YR pinkish white	ox.	B. sherd	MIS
UQ81	bi-chrome gl.	Glazed Ware	4/8 2.5YR dark red	ox.	B. sherd	MIS
UQ88	stain-gl'd (gr.-in-pale y.)	Glazed Ware	7/8 2.5YR light red	ox.	B. sherd	MIS
UQ90		coarse terracotta	8/3 2.5YR pink	ox.	B. sherd	MIS
UQ92	geometric paint	coarse terracotta	5/6 2.5YR red	ox.	B. sherd	MIS
UQ95	stain-gl'd (gr.-in-pale y.)	Glazed Ware	7/8 2.5YR light red	ox.	B. sherd	MIS
UQ181	pale yellow	Glazed Ware	7/6 2.5YR light red	ox.	B. sherd	MIS
UQ186	incising with pale Y.	incised ware	3/6 10R dark red	ox.	B. sherd	MIS
UQ196	geometric paint	coarse terracotta	8/1 5YR white	ox.	B. sherd	MIS
UQ267	bi-chrome gl.	Glazed Ware	2.5/4 dark red	ox.	B. sherd	MIS

UQ274	geometric paint	coarse terracotta	5/6 2.5YR red	ox.	B. sherd	MIS
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C: The sample are arranged according to period, type, site, and traditional archaeological diagnosis for the Late Islamic assemblage.

sample Number	Surface Treatments	Ware	Color	Firing cond.	Type	Date
AB133		Gaza ware (red)	5/8 10YR red	ox.	large bowl	LIS
AB142		Gaza ware (red)	5/6 10YR red	ox.	large bowl	LIS?
AB150	mono-gl'd (y.)	glaze ware	3/6 dark red	ox.	bowl	LIS
AB159		fine terracotta	4/8 2.5 YR red	ox.	jar	LIS?
AB168		fine terracotta	7/4 2.5YR light reddish brown	ox.		
AB170		Gaza ware derivative (sl-p'd)	7/6 10YR light red	ox.	large jar	LIS
AB171	burnished	Gaza ware (grey)	4/4 10R weak red	ox.	basin	LIS
AB186		fine terracotta	4/8 2.5YR red	ox.	jar	LIS
AB188		fine terracotta	8/1 7.5YR white	ox.	large jar	LIS
AB189	mono-gl'd (gr.)	glazed ware	5/8 2.5YR red	ox.	jar/jug (handle)	LIS
AB196	mono-gl'd	glazed ware	5/4 7.5YR brown	ox.	bowl	LIS
AB205	white slipped	coarse terracotta	5/6 10YR red	ox.	jar	LIS?
AB206	mono-gl'd (y.)	glazed ware	5/6 5YR yellowish red	ox.	bowl	LIS?
AB214		fine terracotta	5/8 10R red	ox.	basin/jar	LIS?
AB228		coarse terracotta	3/6 10R dark red	ox.	jar	LIS?
AB287	int. heavily sl'd	fine terracotta	4/6 10YR dark red	ox.	bowl/jar	LIS?
AB300	geometric paint	coarse terracotta	5/6 5YR yellowish red	ox.	jar (handle)	LIS?
AB344	brown slip	Gaza ware derivative	8/3 2.5YR pink	ox.	large jar	LIS
AB402		coarse terracotta	8/4 2.5YR pink	ox.	jar	LIS
AB405	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	jar	LIS
AB406	mono-gl'd (y., no sl.)	glazed ware	3/6 10R dark red	ox.	jar	LIS
AB430	geometric paint	coarse terracotta	7/10B GLEY 2 light bluish gray	red.	jar	LIS
AB441	geometric paint	coarse terracotta	8/3 2.5YR pink	ox.	jar (rim)	LIS?

AB445	stain-gl'd (y.-in-gr.)	glazed ware	8/4 2.5YR pink	ox.	jar (h.)	LIS
AB448	mono-gl'd (gr.)	glazed ware	4/4 10R weak red	ox.	jar	LIS
AB452	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	jar	LIS
AB462	mono-gl'd (gr., no sl.)	glazed ware	4/4 10R weak red	ox.	bowl	LIS
AB463		Gaza ware	3/6 10R dark red	ox.	jar/basin	LIS
AB470		fine terracotta	3/6 10R dark red	ox.	large jar/basin	LIS?
AB472		Gaza ware derivative	5/8 10R red	ox.	jar/basin	LIS
AB475	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	jar (spout)	LIS
AB487	burnished	Gaza ware	5/4 7.5YR brown	ox.	large jar	LIS
AB488	mono-gl'd (gr.)	glazed ware	8/4 2.5YR pink	ox.	bowl	MIS
AB504		earthen ware	4/4 10R weak red	ox.	jar	LIS
AB551		fine terracotta	5/8 10R red	ox.	large jar/basin	LIS?
AB561		Gaza ware	5/4 7.5YR brown	ox.	jar (neck)	LIS
AB588	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	bowl	LIS
AB652	sl-p'd (gr. gl.)	glazed ware	5/8 10R red	ox.	bowl	LIS
UQ7	mono-gl'd (br.)	glazed ware	4/4 10R weak red	ox.	B. sherd	LIS
UQ11	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	handle	LIS
UQ12	mono-gl'd (gr.)	glazed ware	4/4 10R weak red	ox.	bowl	LIS
UQ13		fine terracotta	5/8 10R red	ox.	jar sherd	LIS
UQ14	bi-chrome gl'd (gr.y.)	glazed ware	8/3 2.5YR pink	ox.	plate rim	LIS
UQ16	mono-gl'd (br.)	glazed ware	5/8 10R red	ox.	bowl	LIS
UQ27		fine terracotta	3/6 10R dark red	ox.	big jar handle	LIS
UQ28	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	bowl base	LIS
UQ30	burnished	fine terracotta	5/4 7.5YR brown	ox.		LIS
UQ31		fine terracotta	4/2 7.5YR brown	ox.	jar sherd	LIS
UQ34		Gaza ware derivative	4/4 10R weak red	ox.	jar sherd	LIS
UQ49	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	bowl	LIS
UQ61		Gaza ware derivative	5/8 10R red	ox.	B. sherd	LIS
UQ72		coarse terracotta	4/4 10R weak red	ox.	B. sherd	LIS
UQ073		coarse terracotta	3/6 10R dark red	ox.	B. sherd	LIS
UQ076	mono-gl'd (br.)	glazed ware	5/8 10R red	ox.	bowl rim	LIS
UQ115	stamp	pipe ware	6/8 10R light red	ox.	pipe	LIS
UQ130	burnished	Gaza ware derivative	8/2 7.5YR pinkish white	ox.	B. sherd	LIS

UQ135	burnished	Gaza ware derivative	8/3 2.5YR pink	ox.	B. sherd	LIS
UQ136		coarse terracotta	6/10B GLEY 2 light bluish gray	red.	B. sherd	LIS
UQ137		coarse terracotta	5/5PB GLEY 2 bluish gray	red.	B. sherd	LIS
UQ138		coarse terracotta	4/10PG GELY 2 dark greenish gray	red.	B. sherd	LIS
UQ144		coarse terracotta	6/10B GLEY 2 light bluish gray	red.	larg jar rim	LIS
UQ147	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	B. sherd	LIS
UQ152		coarse terracotta	5/5PB GLEY 2 bluish gray	red.	B. sherd	LIS
UQ157	mono-gl'd (br.)	glazed ware	8/3 2.5YR pink	ox.	B. sherd	LIS
UQ158		coarse terracotta	5/5PB GLEY 2 bluish gray	red.	B. sherd	LIS
UQ172	mono-gl'd (br.)	glazed ware	8/3 2.5YR pink	ox.	bowl	LIS
UQ182	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	bowl base	LIS
UQ183	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	bowl	LIS
UQ184	burnished	Gaza ware derivative	6/4 5YR light reddish brown	ox.	jug rim	LIS
UQ191		coarse terracotta	6/10B GLEY 2 light bluish gray	red.	B. sherd	LIS
UQ198		fine terracotta	5/8 10R red	ox.	big jar handle	LIS
UQ210	mono-gl'd (gr.)	glazed ware	8/2 7.5YR pinkish white	ox.	bowl	LIS
UQ213	mono-gl'd (gr.)	glazed ware	8/3 2.5YR pink	ox.	bowl base	LIS
UQ235		coarse terracotta	3/6 10R dark red	ox.	body sherd	LIS
UQ271		Gaza ware	6/10B GLEY 2 light bluish gray	red.	small jar rim	LIS

D. Catalog of the Early Islamic period studied samples.

AB85



AB90



AB104a



AB104b



AB126



AB164



AB168



AB207



AB243



AB253



AB259



AB272



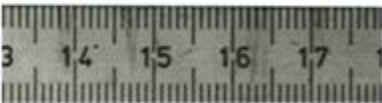
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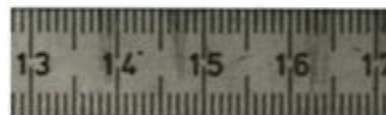
AB397



AB531



AB665



AB667



AB668



UQ20



UQ127



UQ163



HM.P381



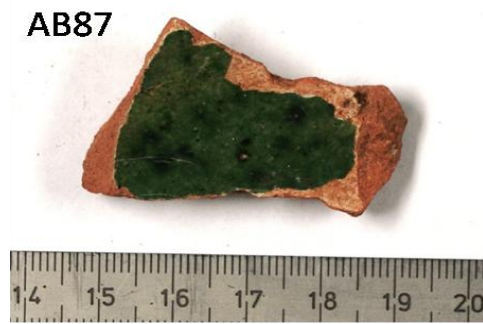






Note: all the unnumbered samples belong to the site Umm el-Jimal.

E. Catalog of the Middle Islamic period studied samples.



AB267



AB431



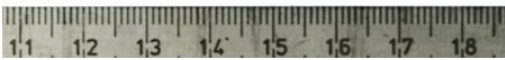
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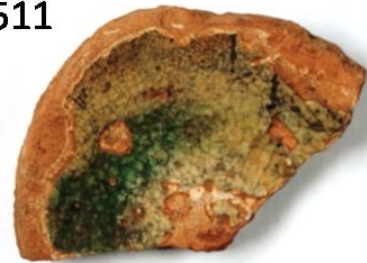
AB488



AB506



AB511





UQ267

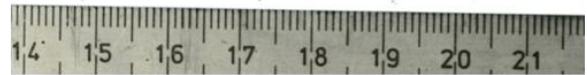


F. Catalog of the Late Islamic period studied samples.

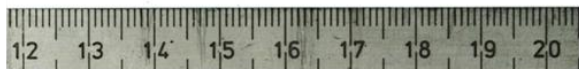
AB88



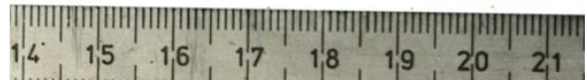
AB133



AB142



AB150



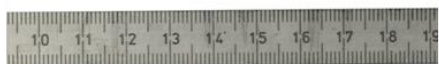
AB159



AB168



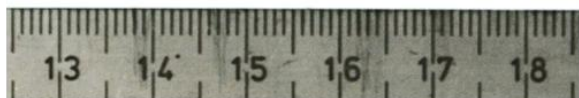
AB170



AB171



AB186



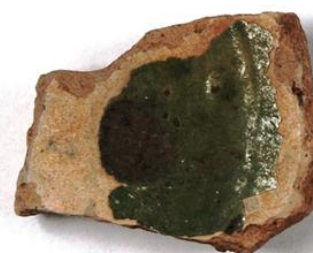
AB188



AB189



AB196



AB344



AB402



AB405



AB406



AB430



AB441



AB445



AB448



AB452



AB462



AB463



AB470



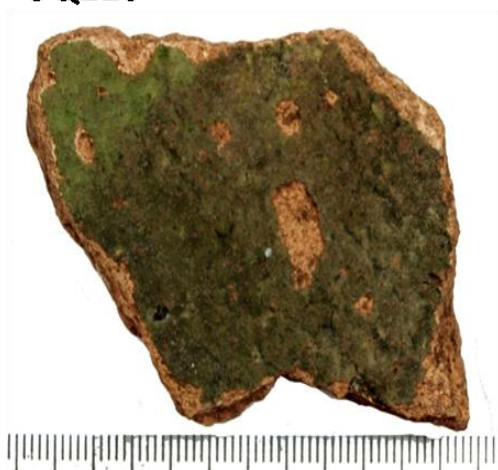
UQ191



UQ198



UQ210



UQ213



UQ235



UQ271



G. Catalog of the photomicrographs acquired by the polarizing microscope order according to sites sequence.

G.1: the most distinctive photomicrographs of some samples from Abila.

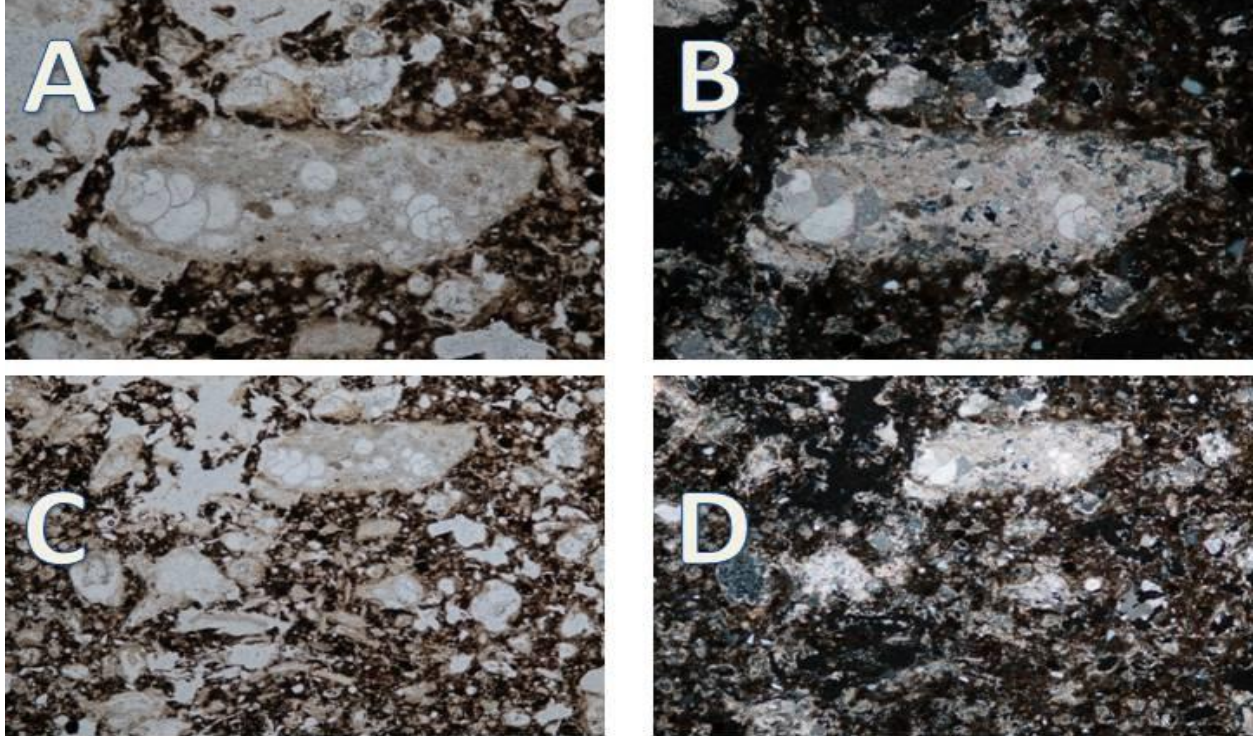


Photo micrographs showing the texture and non-plastic inclusions in sample AB86. a: coarse calcareous clasts with many un-disturbed structure by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm. c: higher magnification of the clast (PPL) mode, image width 1mm. d: (CPL) mode, image width 1mm.

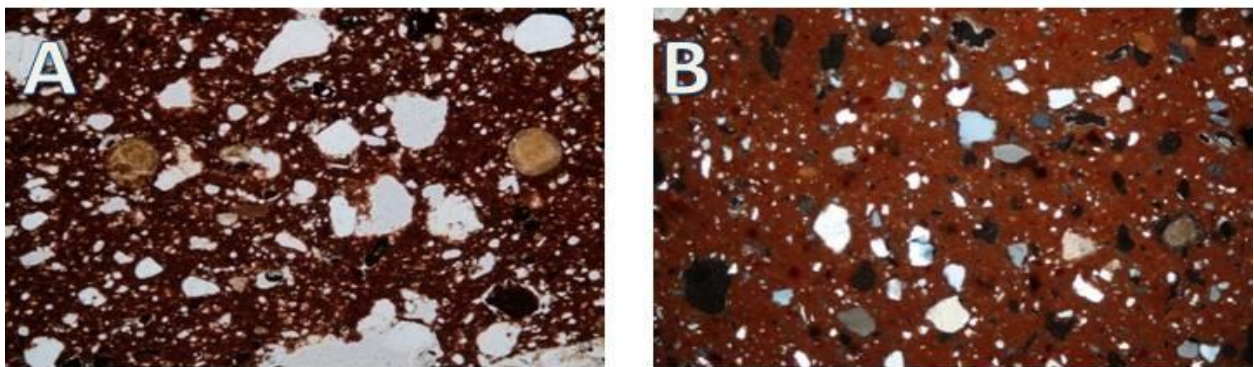


Photo micrographs showing the texture and non-plastic inclusions in sample AB87. a: coarse angular quartz clasts. a: different quartz clasts, and calcined carbonate fossil by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

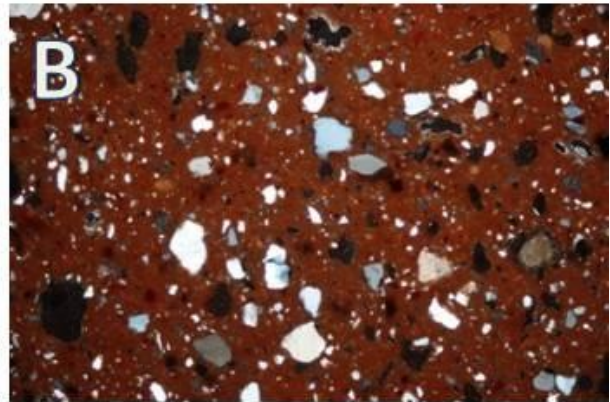
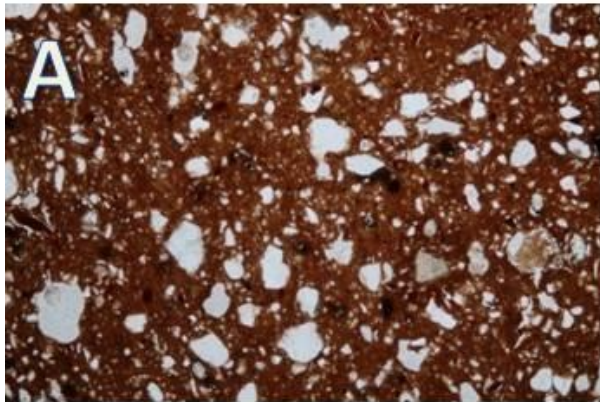


Photo micrographs showing the texture and non-plastic inclusions in sample AB88. a: coarse sub-angular quartz clasts. a: different quartz clasts, by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

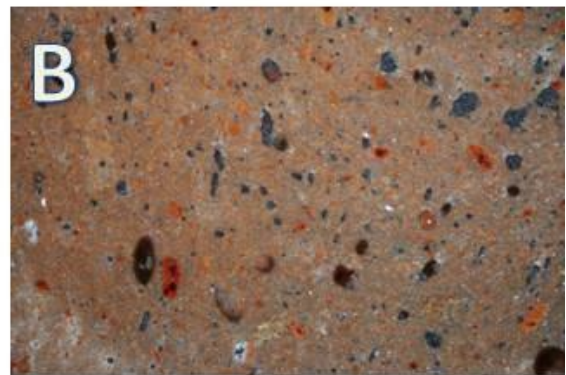
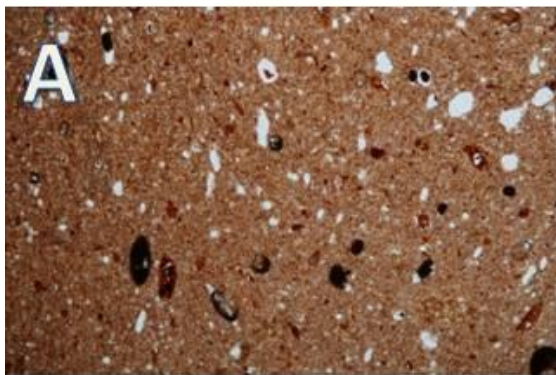


Photo micrographs showing the texture and non-plastic inclusions in sample AB90. a: coarse sub-angular quartz clasts. a: different quartz clasts, by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

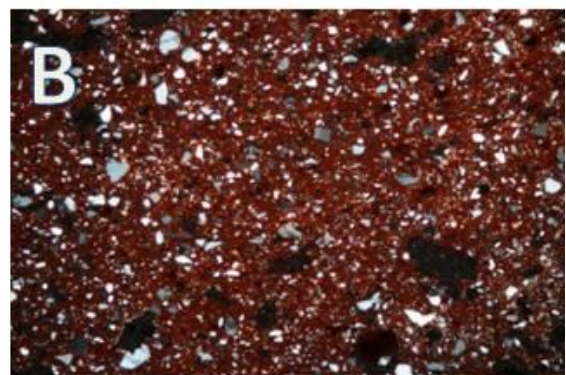
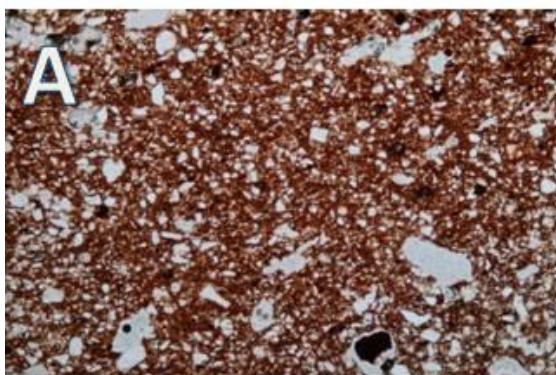


Photo micrographs showing the texture and non-plastic inclusions in sample AB130. a: very high concentration of sub-angular quartz clasts. (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

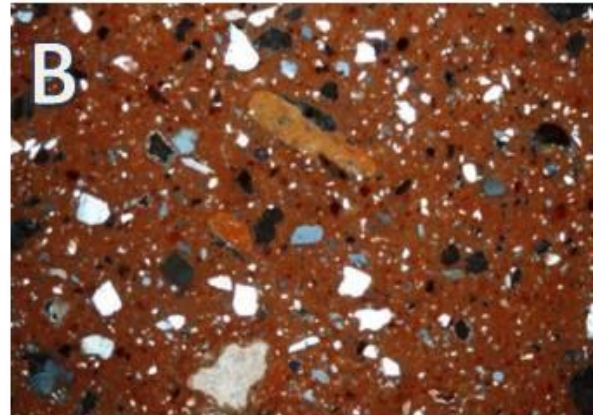
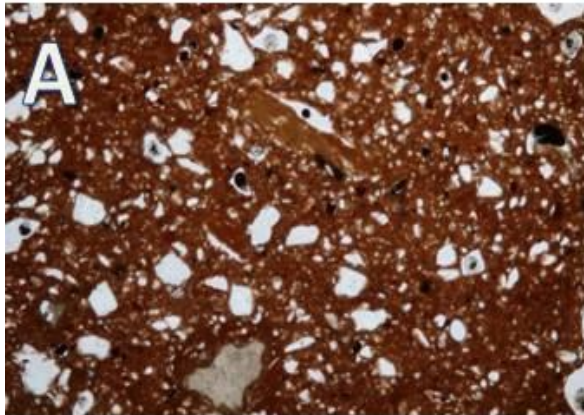


Photo micrographs showing the texture and non-plastic inclusions in sample AB150. a: different sub angular quartz clasts and one dehydroxylated calcite hazy matrix. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

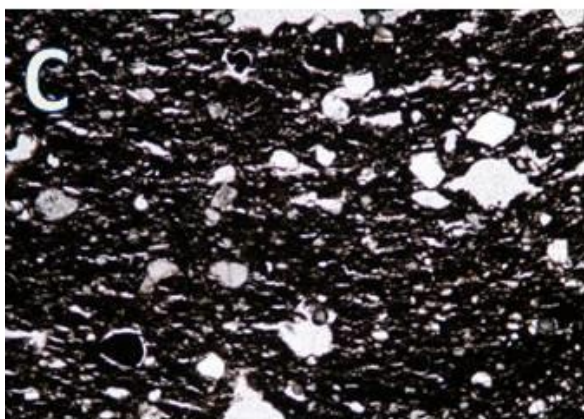
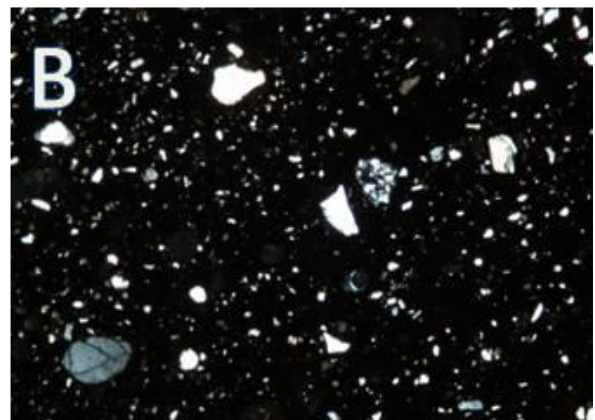
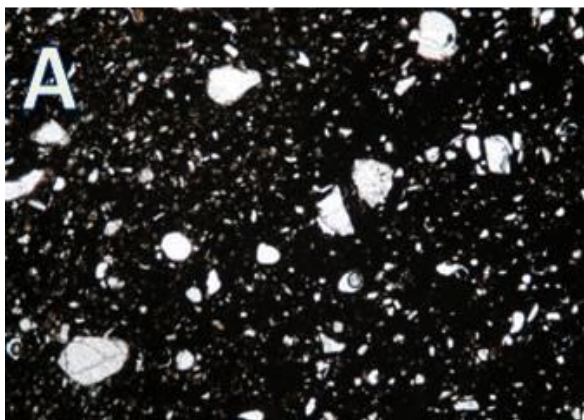


Photo micrographs showing the texture and non-plastic inclusions in sample AB171. a: mainly fine sub rounded quartz clasts and few coarse sub-rounded. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm. C: oriented pores in the same direction. by (PPL) mode, image width 2mm D: clayey materials slipping over non-plastic clasts.

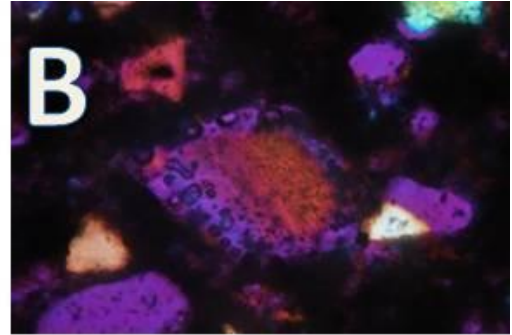
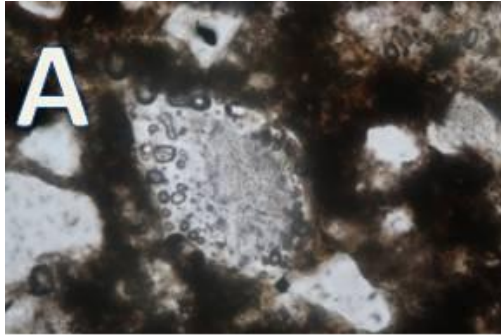


Photo micrographs showing the texture and non-plastic inclusions in sample AB171. a: K-feldspar partially melting points temp. around 1100°C by (PPL) mode, image width 0.2mm. b: same image with lambda plate by (CPL) mode, image width 0.2mm.

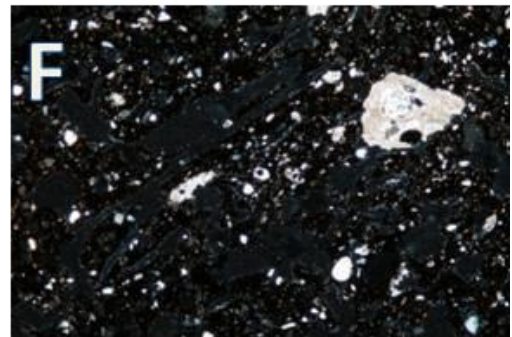
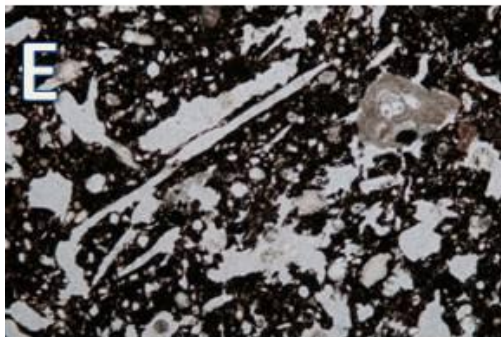
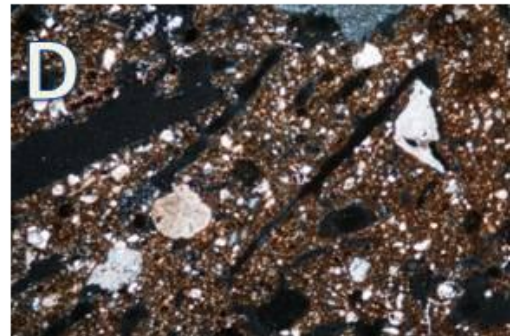
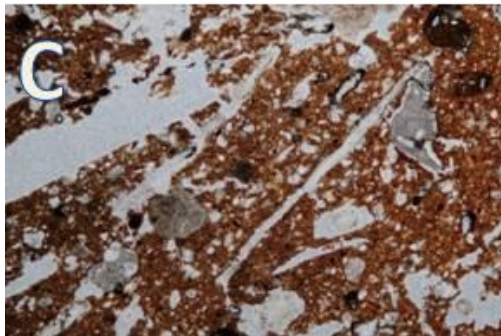
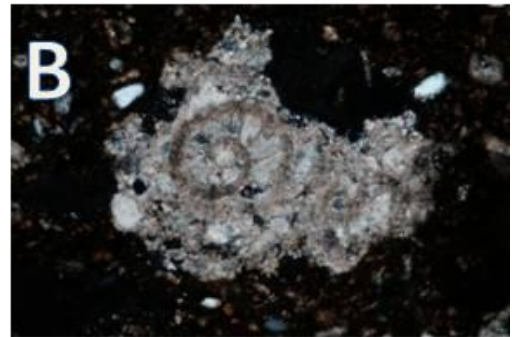
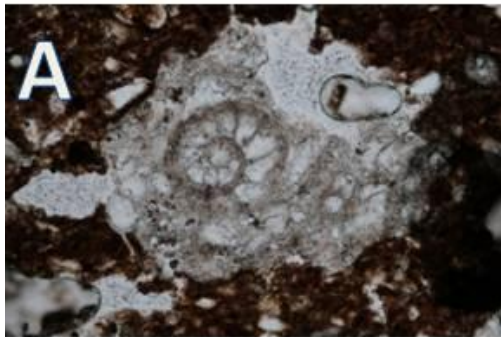


Photo micrographs showing the texture and non-plastic inclusions in sample AB172. a: micro-fossil undisturbed. by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, image width 0.5mm. C: chaff (organic) pores with rounded tips. by (PPL) mode, image width 2mm D: same image in (CPL) mode, image width 2mm. E: different spot chaff pores by (PPL) mode, image width 2mm. F: same image in (CPL) mode, image width 2mm.

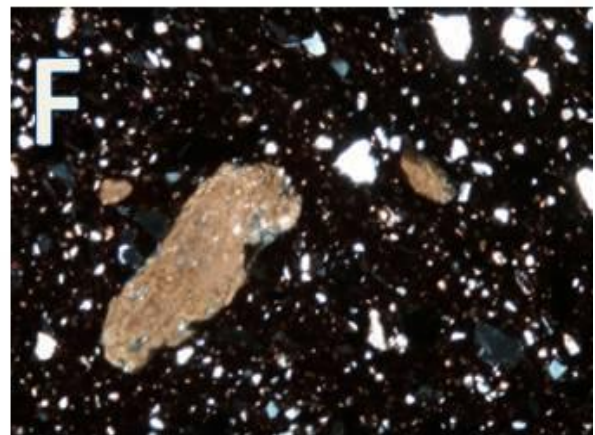
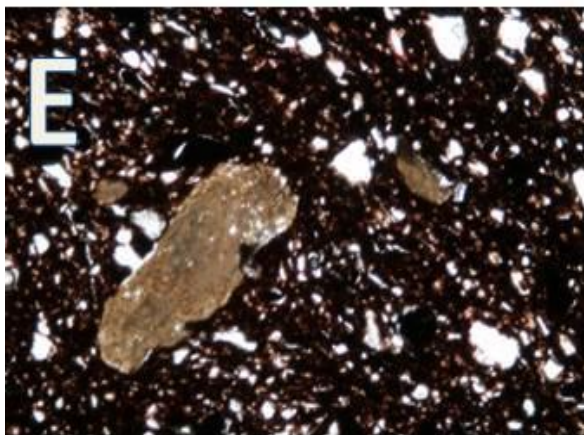
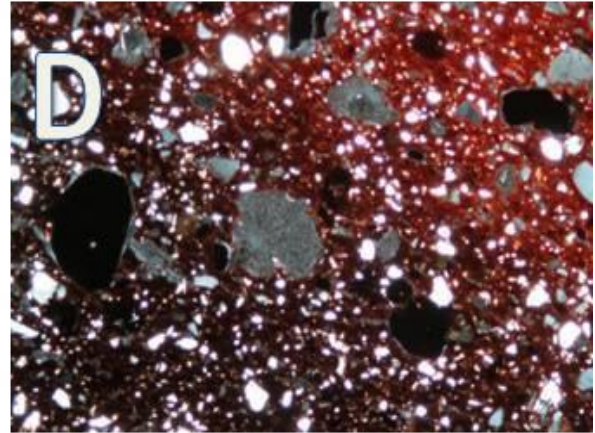
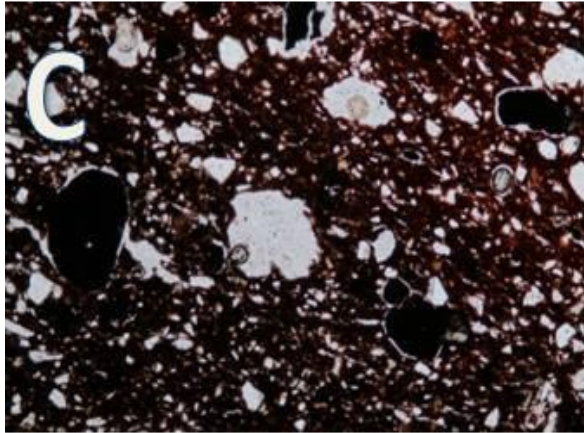
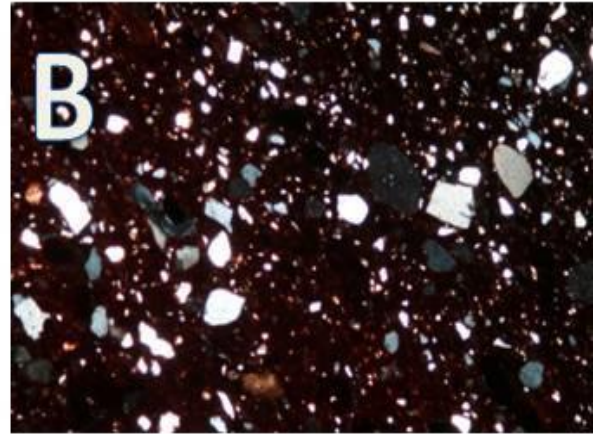
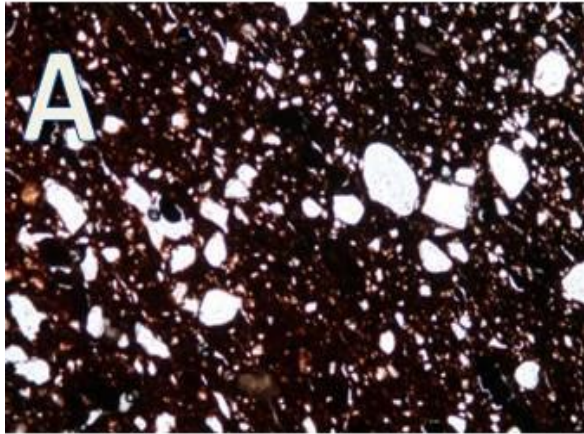


Photo micrographs showing the texture and non-plastic inclusions in sample AB214. a: oriented rounded fine quartz clasts. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm. C: rounded black spots iron related detached from the matrix. by (PPL) mode, image width 2mm D:same image in (CPL) mode, image width 2mm. E: rock clast, by (PPL) mode, image width 2mm. F: same image in (CPL)mode, image width 2mm.

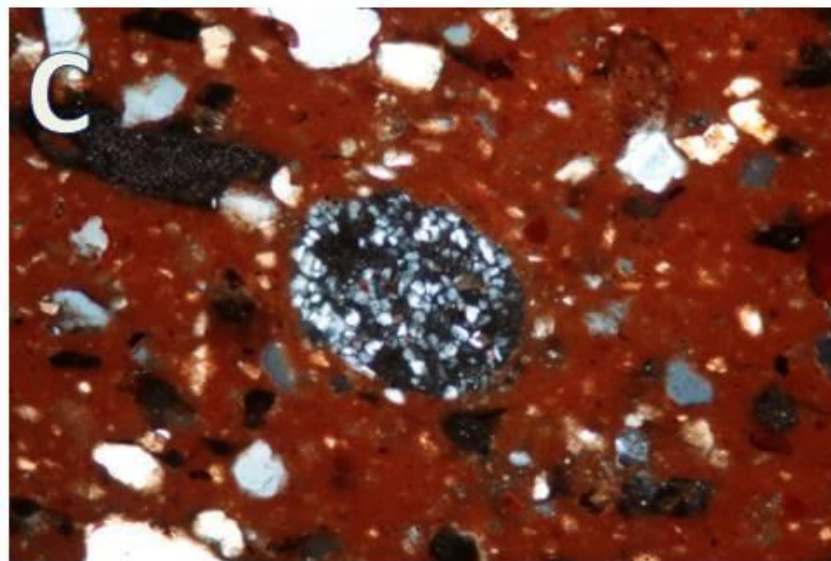
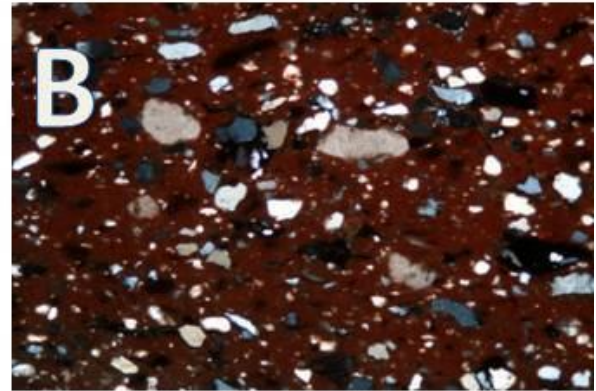
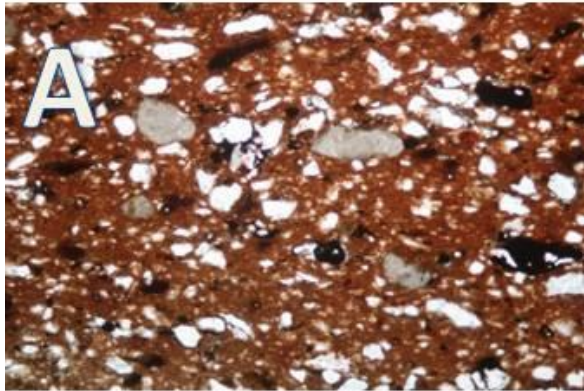


Photo micrographs showing the texture and non-plastic inclusions in sample AB448. a: calcite clasts overreacted in a fine matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm. C: rounded sandstone clast by (PPL) mode, image width 0.5mm.

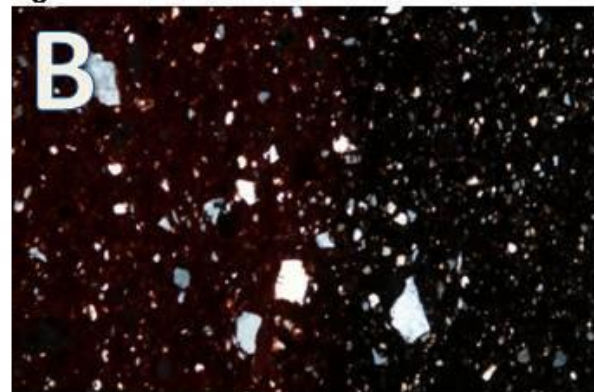
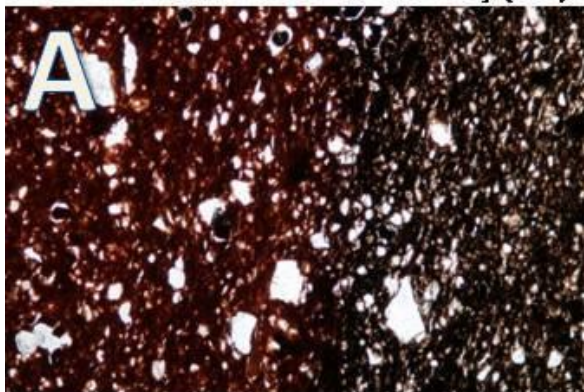


Photo micrographs showing the texture and non-plastic inclusions in sample AB463. a: different redox ratios between the interior and the exterior of the body by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

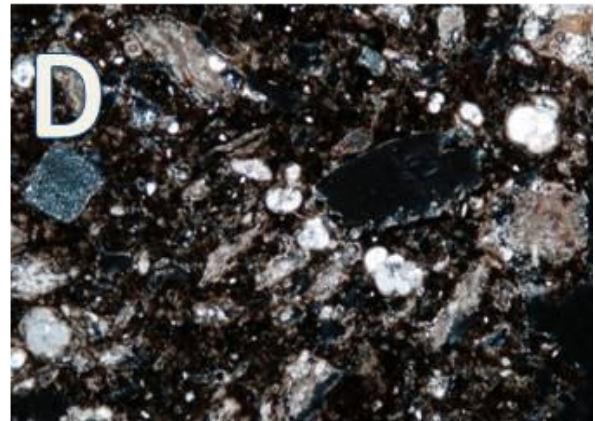
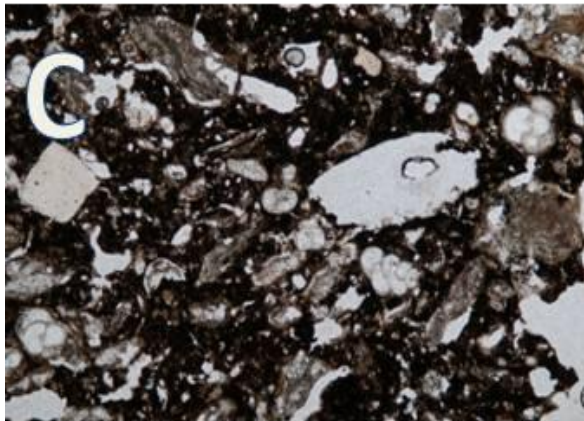
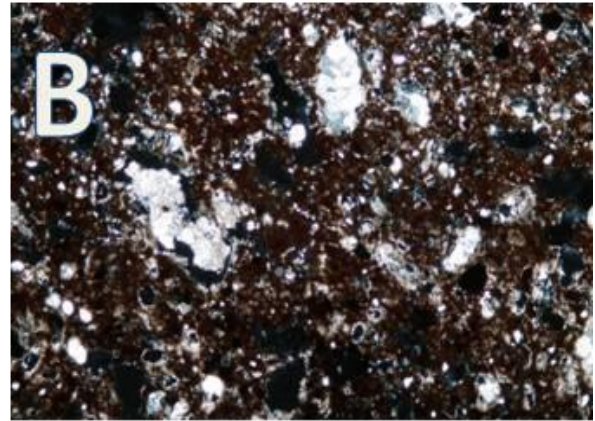
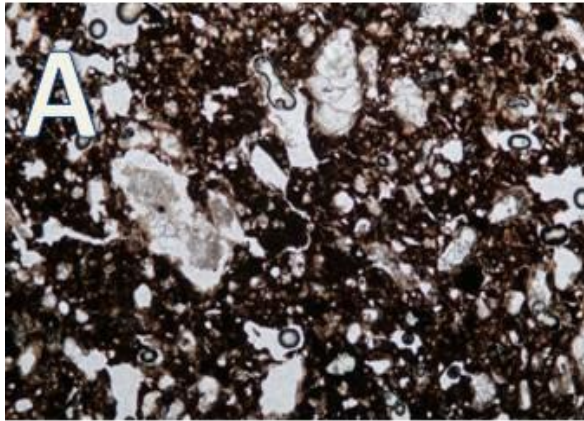


Photo micrographs showing the texture and non-plastic inclusions in sample AB340. a: plagioclase (basaltic clasts), and grog fragments. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm. C: undisturbed micro-fossils. by (PPL) mode, image width 2mm D:same image in (CPL) mode, image width 2mm.

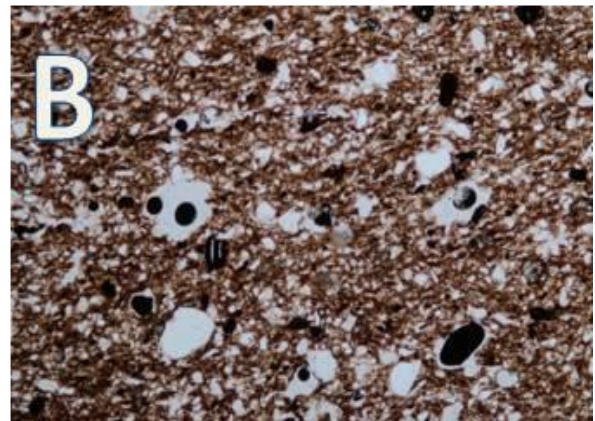
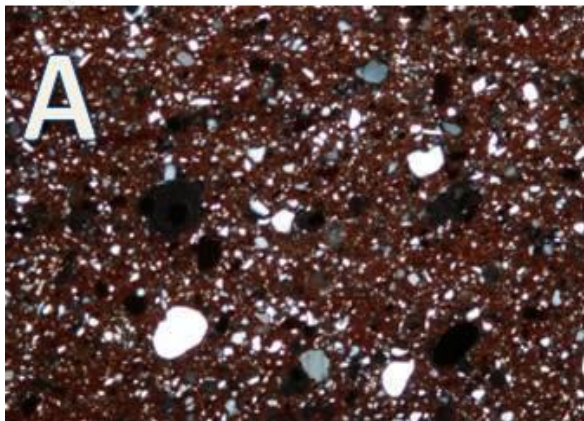


Photo micrographs showing the texture and non-plastic inclusions in sample AB344. a: very rounded fine quartz clasts and rounded dark spots related to iron. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

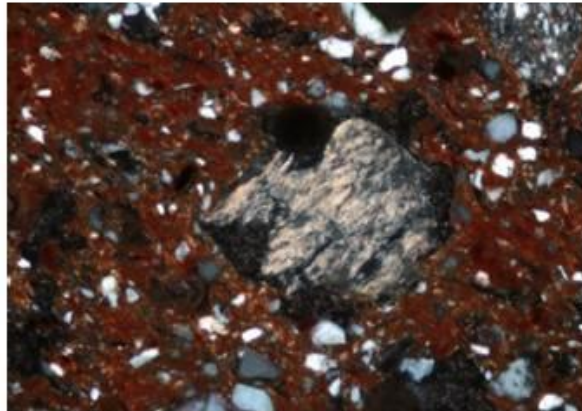


Photo micrographs showing the non-plastic highly fired grog the in sample AB344. by (PPL) mode, image width 0.5mm.

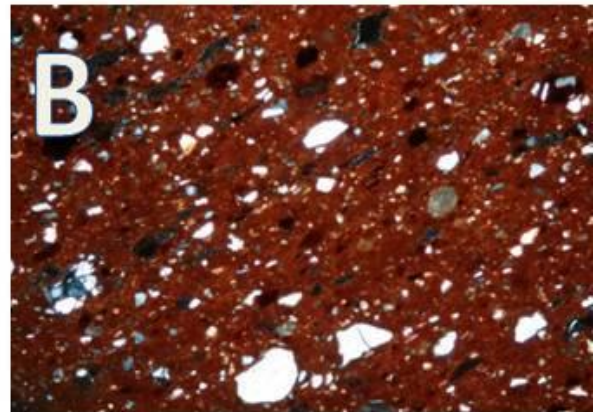
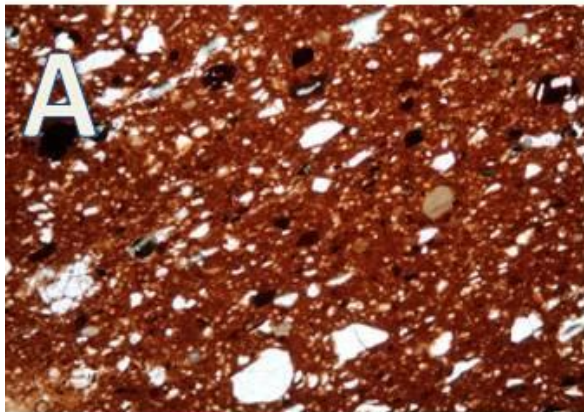


Photo micrographs showing the texture and non-plastic inclusions in sample AB397. a: highly fired oriented matrix, and rounded fine quartz clasts. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

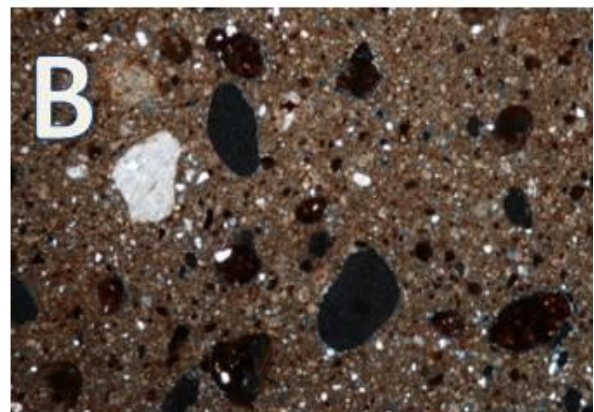
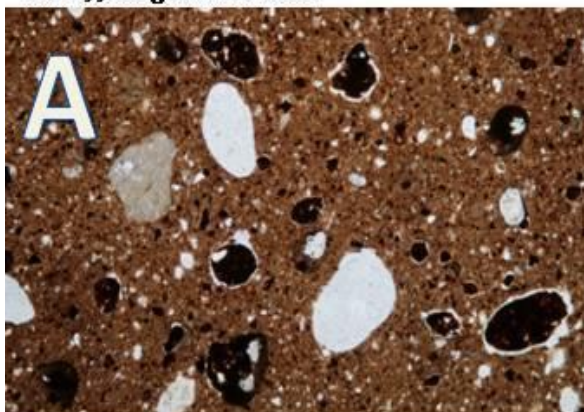


Photo micrographs showing the texture and non-plastic inclusions in sample AB440. a: many brown dark spots related to iron, and over reacted calcite clast. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

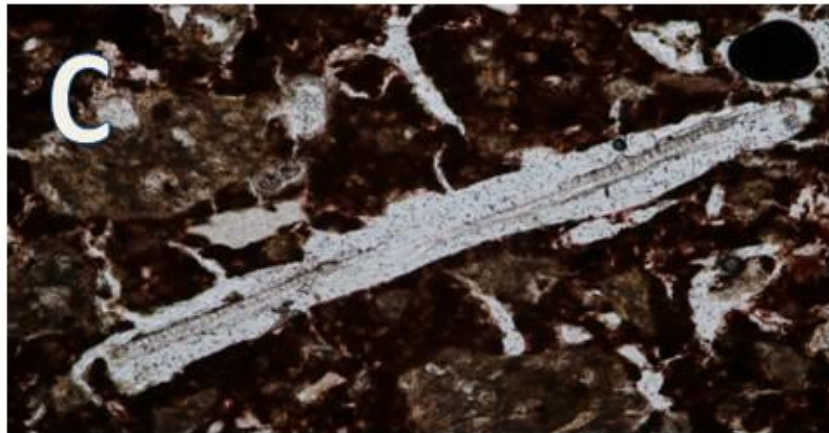
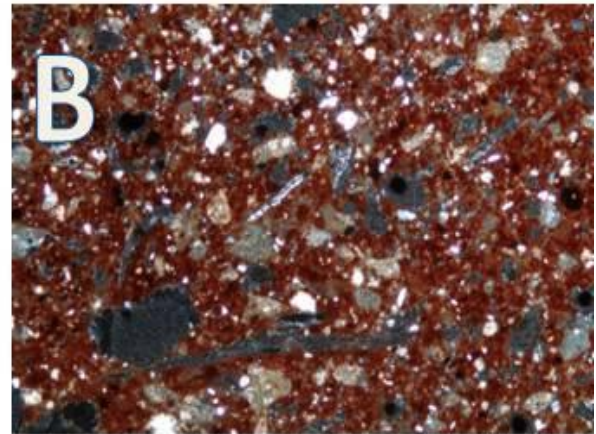
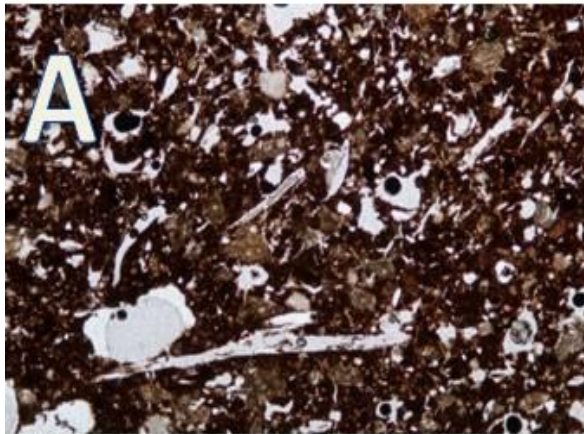


Photo micrographs showing the texture and non-plastic inclusions in sample AB441. a: plenty of chaff (organic) remnant added as temper by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm. C: close up by (PPL) mode, image width 1mm.

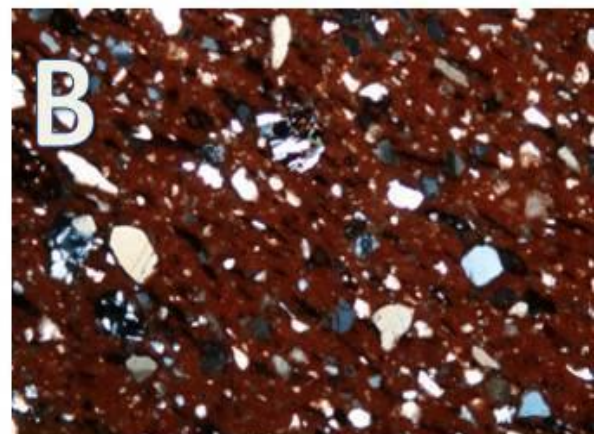
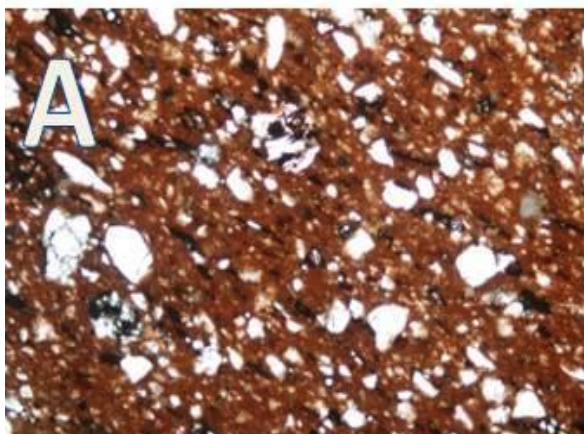


Photo micrographs showing the texture and non-plastic inclusions in sample AB448. a: many basalt, and rounded quartz clasts. by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

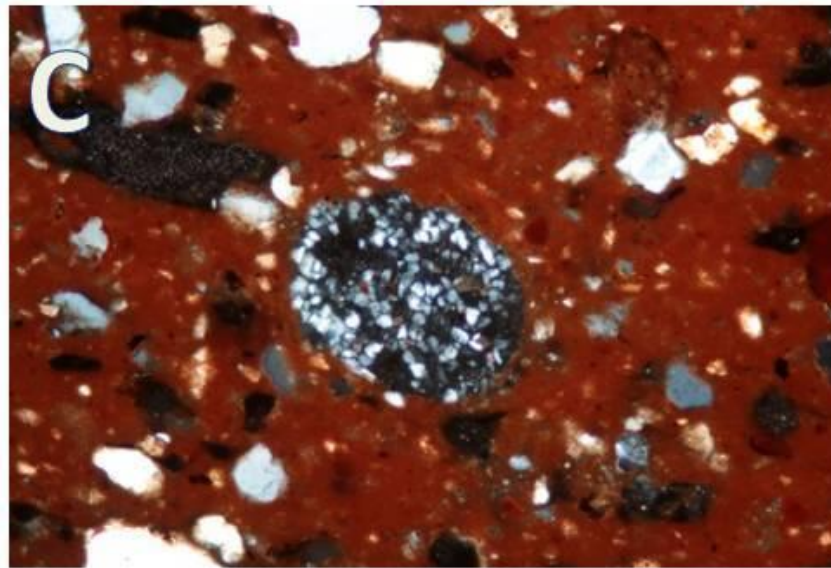
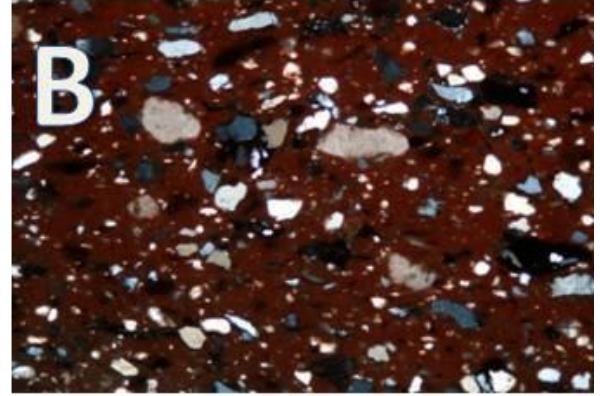
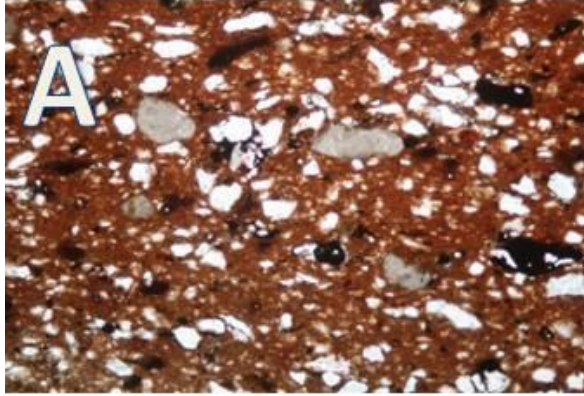


Photo micrographs showing the texture and non-plastic inclusions in sample AB448. a: calcite clasts overreacted in a fine matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm. C: rounded sandstone clast by (PPL) mode, image width 0.5mm.

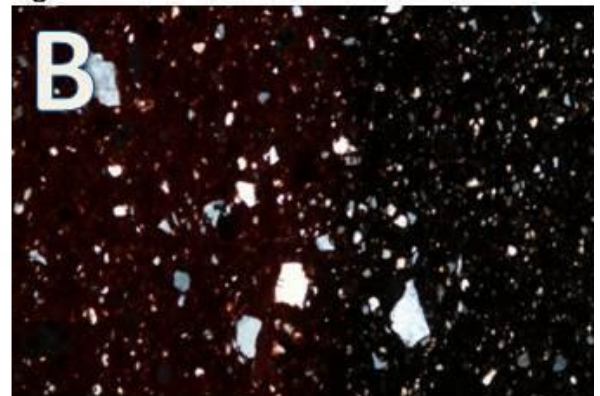
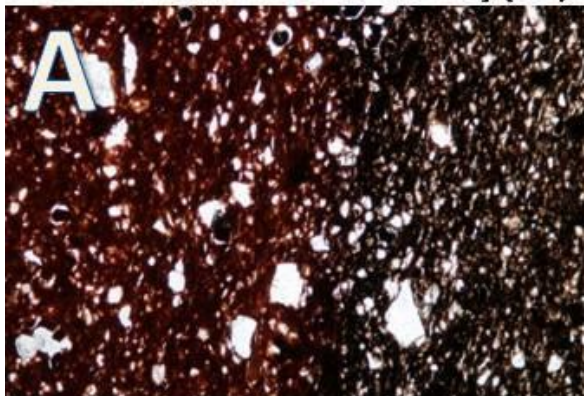


Photo micrographs showing the texture and non-plastic inclusions in sample AB463. a: different redox ratios between the interior and the exterior of the body by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

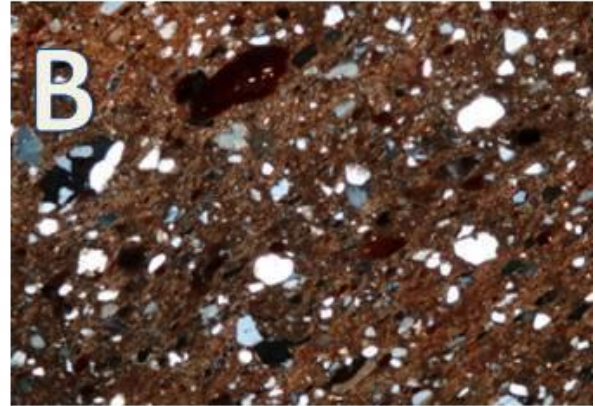
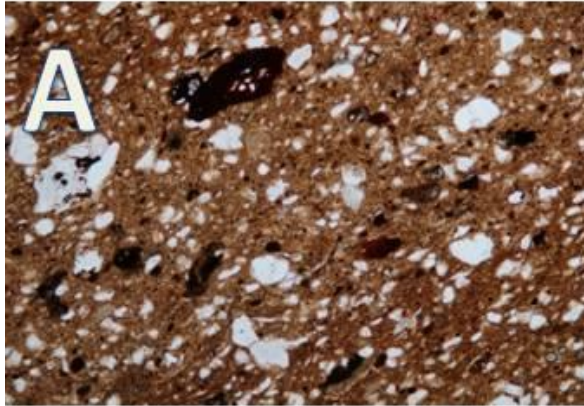


Photo micrographs showing the texture and non-plastic inclusions in sample AB504. a: oriented matrix with many rounded medium to fine quartz clasts, by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

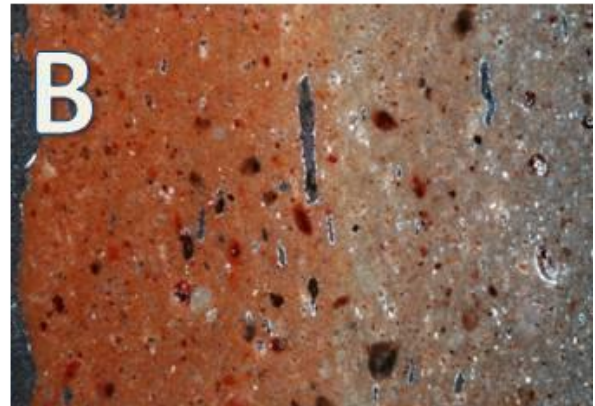
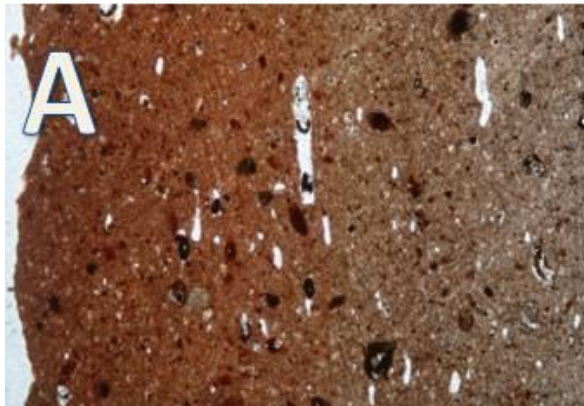


Photo micrographs showing the texture and non-plastic inclusions in sample AB531. a: very fine matrix with different redox ratios and some secondary calcite precipitated around the pores, by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

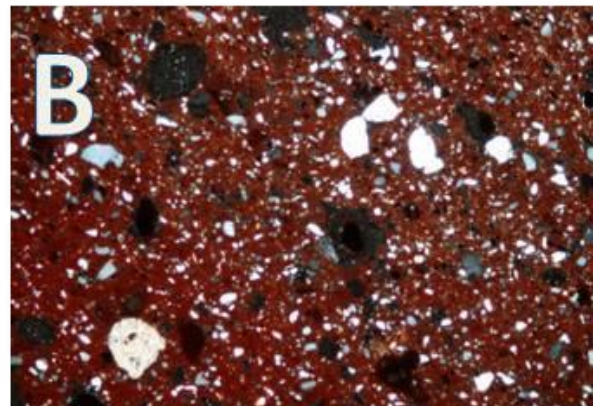
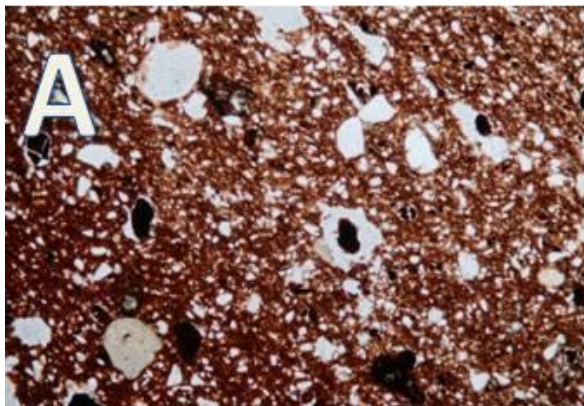


Photo micrographs showing the texture and non-plastic inclusions in sample AB551. a: plenty of rounded inclusions like quartz and over reacted calcite clasts, by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

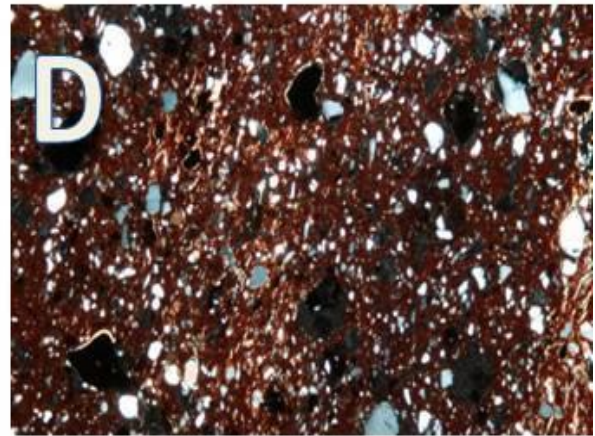
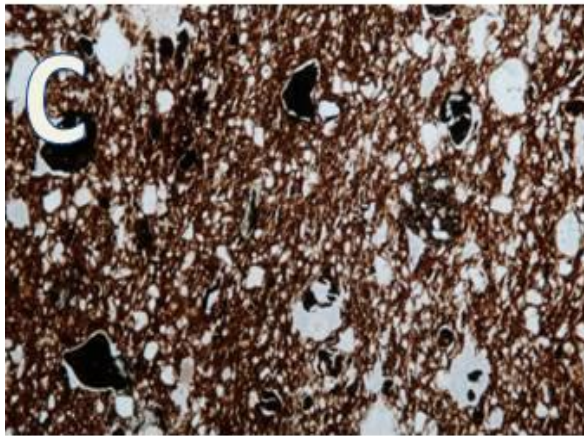
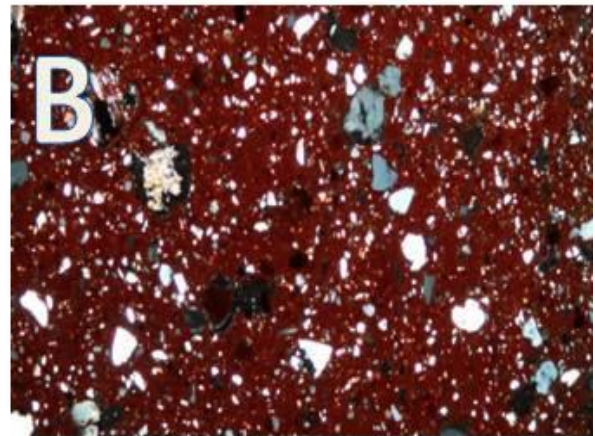
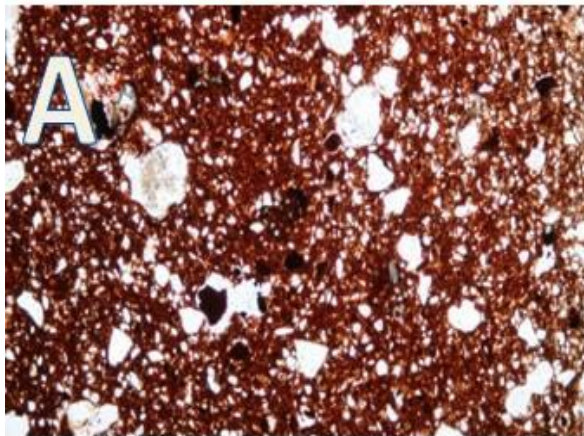


Photo micrographs showing the texture and non-plastic inclusions in sample AB551. a: plagioclase (basaltic clasts), and fine mica clasts . by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm. C: secondary calcite filling the micro-cracks by (PPL) mode, image width 2mm D:same image in (CPL) mode, image width 2mm.

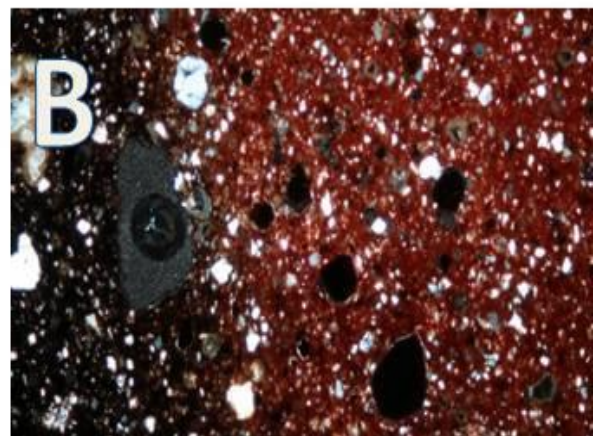
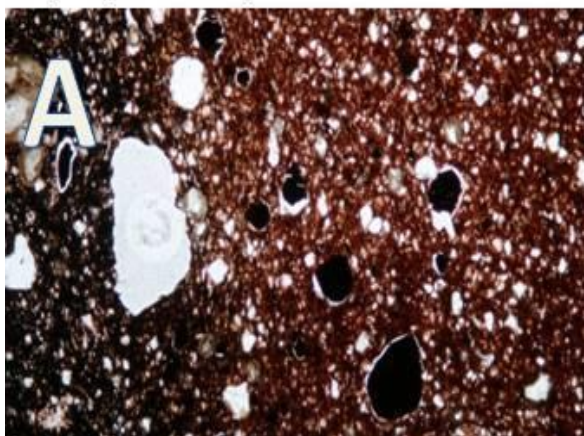


Photo micrographs showing the texture and non-plastic inclusions in sample AB561. a: different redox ratios with many dark spots and secondary calcite by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

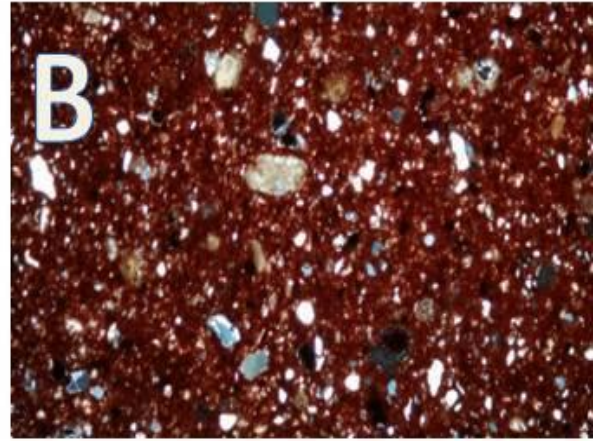
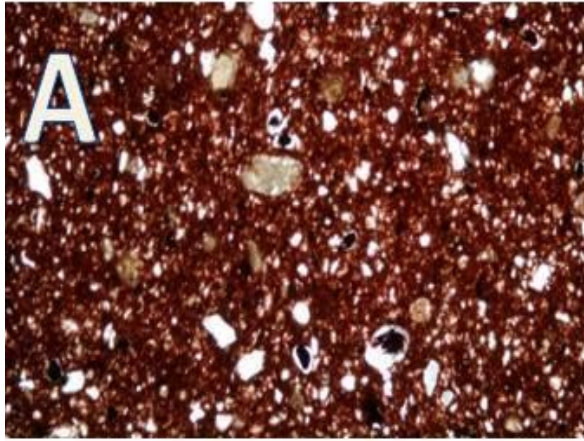


Photo micrographs showing the texture and non-plastic inclusions in sample AB561. a: over reacted calcite in a fine matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm.

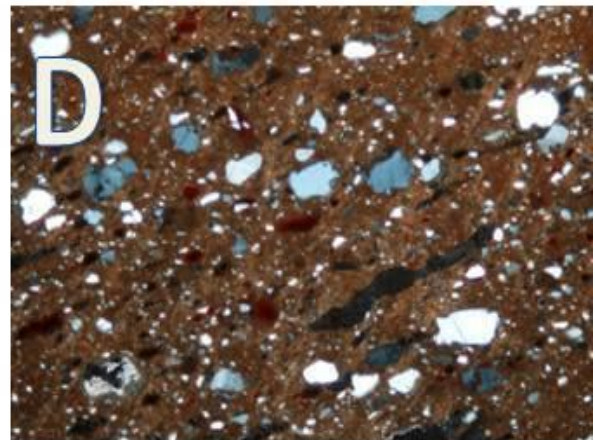
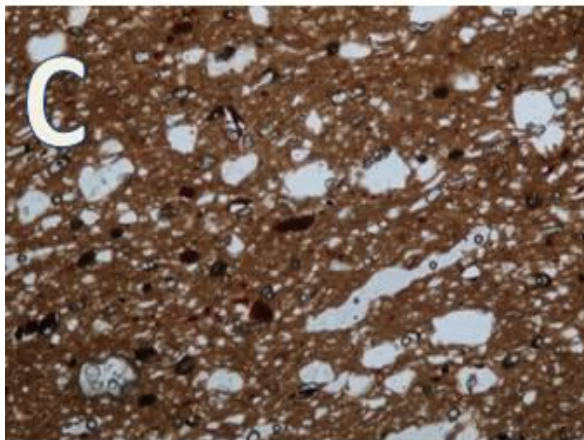
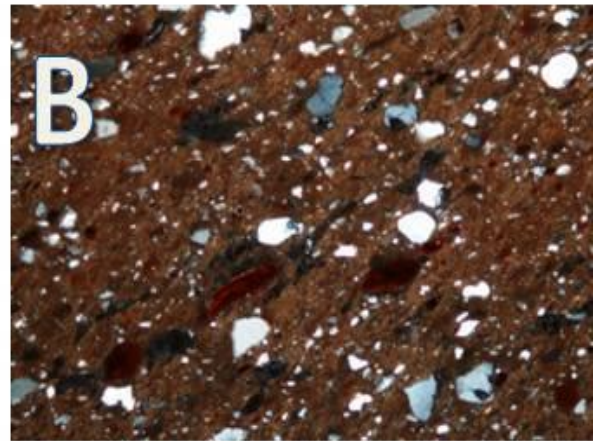
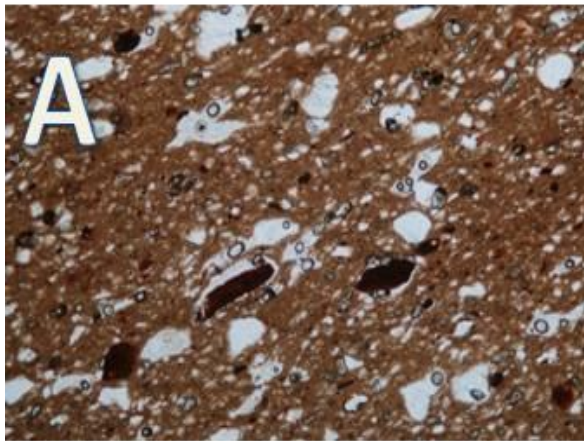


Photo micrographs showing the texture and non-plastic inclusions in sample AB588. a: oriented rounded inclusions in fine matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, , image width 2mm. C: oriented pores in the same direction. by (PPL) mode, image width 2mm D: clayey materials slipping over non-plastic clasts.

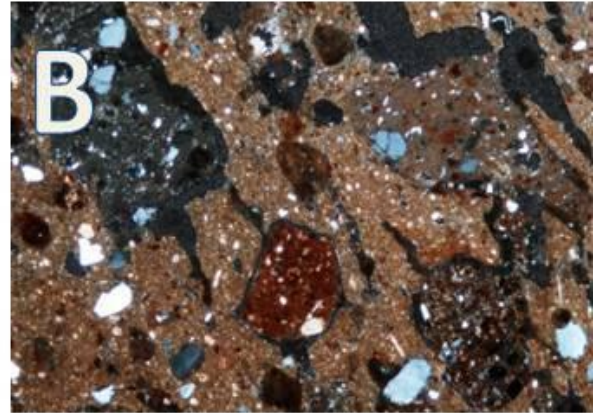
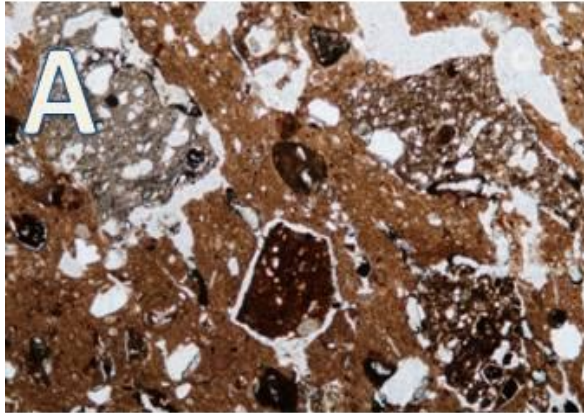


Photo micrographs showing the texture and non-plastic inclusions in sample AB650. a: coarse grinded grog clasts detached from the matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

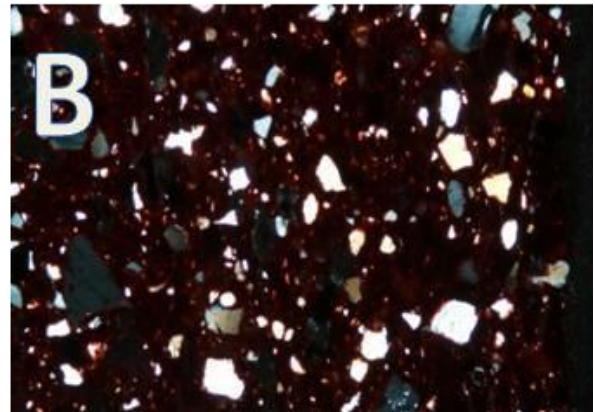
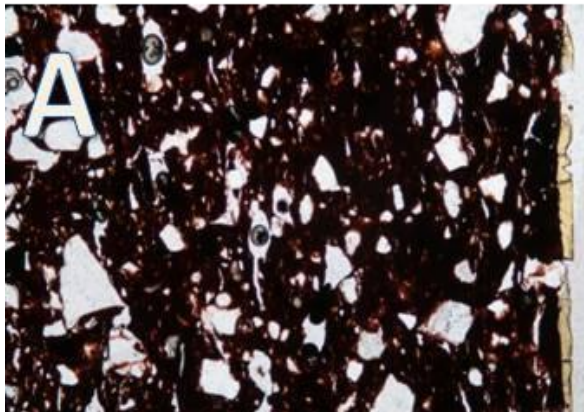


Photo micrographs showing the texture and non-plastic inclusions in sample AB652. a: plenty of sharp edges quartz clasts in dark matrix by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

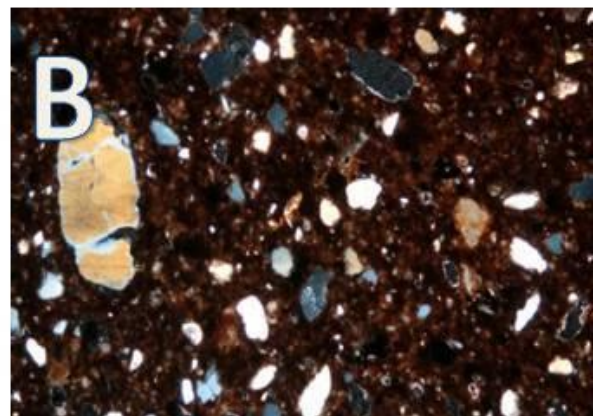
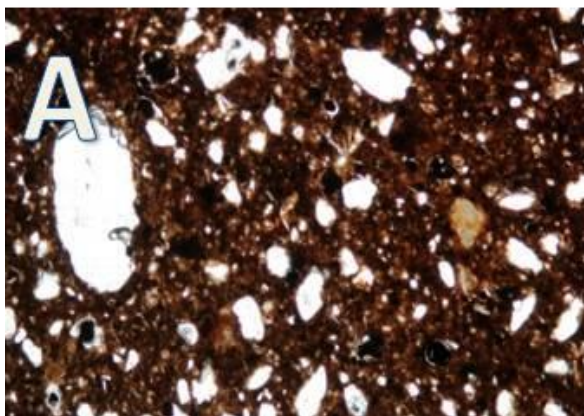


Photo micrographs showing the texture and non-plastic inclusions in sample KH492. a: sintered dark matrix with sub-rounded quartz clasts by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

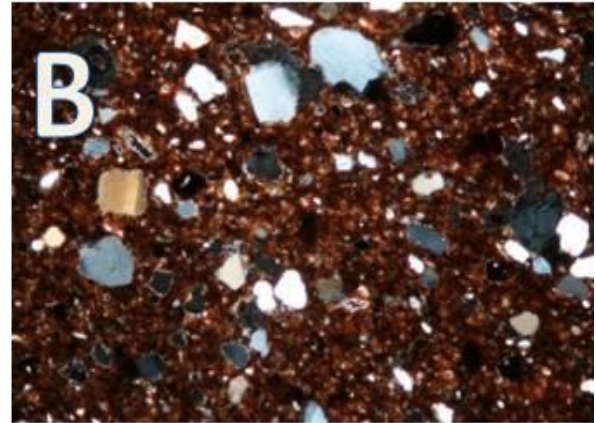
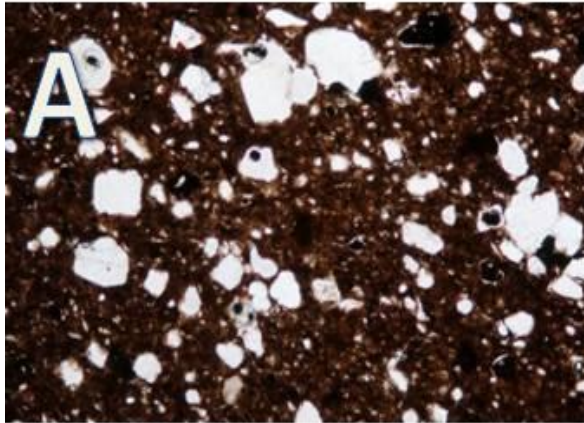


Photo micrographs showing the texture and non-plastic inclusions in sample KH492. a: plenty of sub-rounded quartz clasts and some secondary calcite in the pores by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

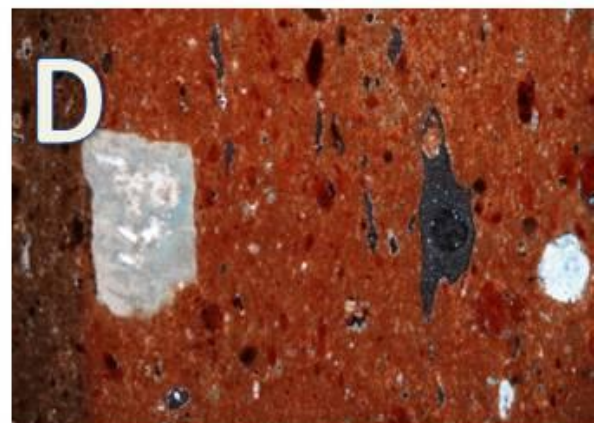
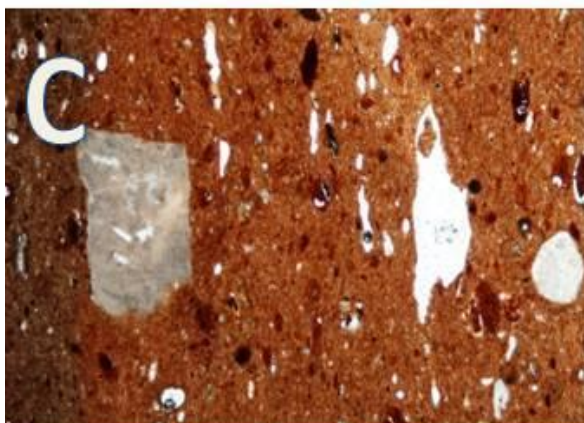
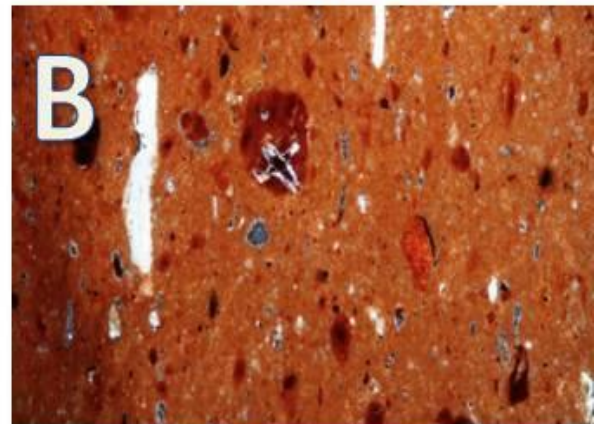
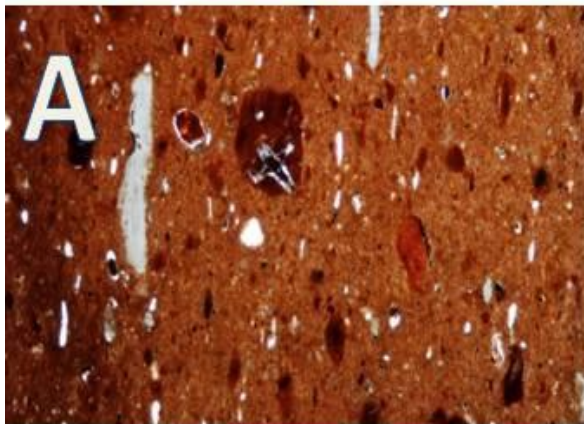


Photo micrographs showing the texture and non-plastic inclusions in sample P159. a: oriented very fine matrix with some redish spots related to iron by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm. C: over reacted calcite and one larg rock fragment by (PPL) mode, image width 2mm D: clayey materials slipping over non-plastic clasts.

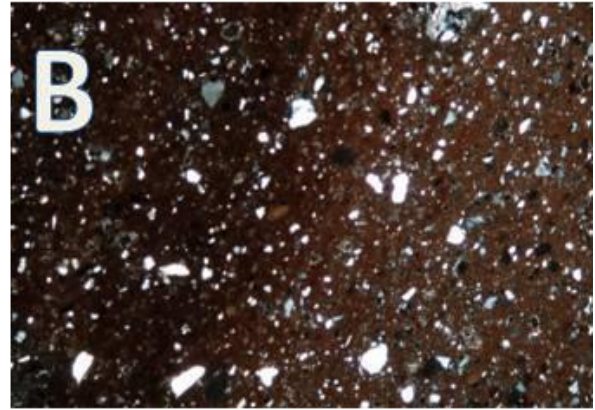
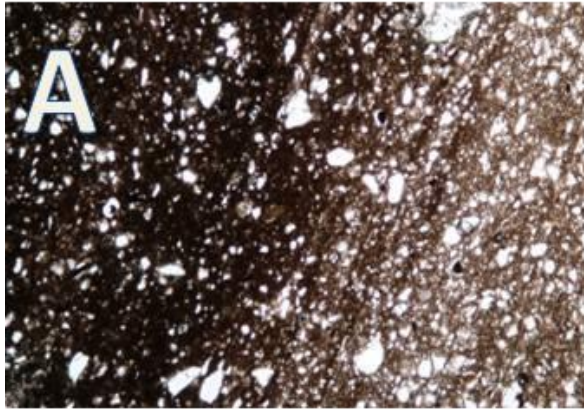


Photo micrographs showing the texture and non-plastic inclusions in sample P381. a: fine sub-rounded quartz clasts and some secondary calcite in the pores by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

G.2: The most distinctive photomicrographs of some samples from Gadara.

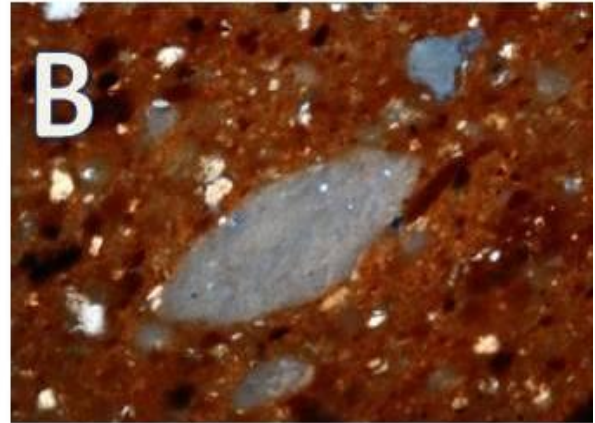
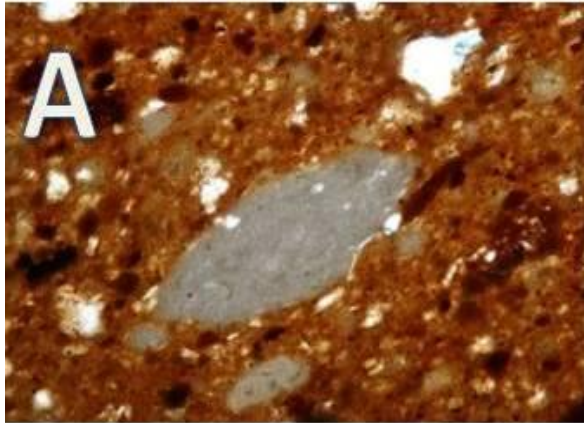


Photo micrographs showing the texture and non-plastic inclusions in sample UQ4. a: fine matrix highly sintered contains rounded inclusions clasts by (PPL) mode, image width 1mm. b: same image but in (CPL) mode, image width 1mm.

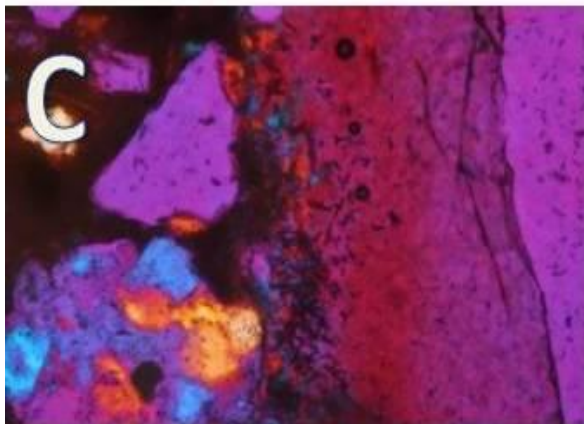
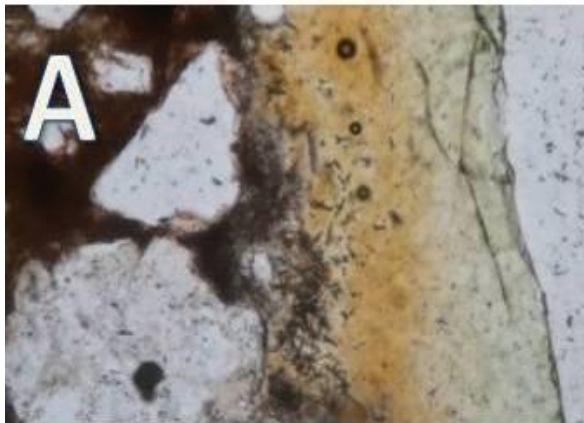


Photo micrographs showing the texture and non-plastic inclusions in sample UQ7. a: diffusion of glaze layer within then body and part of it started crystallization by (PPL) mode, image width 0.2mm. b: same image by (PPL) mode, , image width 0.2mm. C: same image introduced to lambda plate showing glaze crystallization by (PPL) mode, image width 0.2mm.

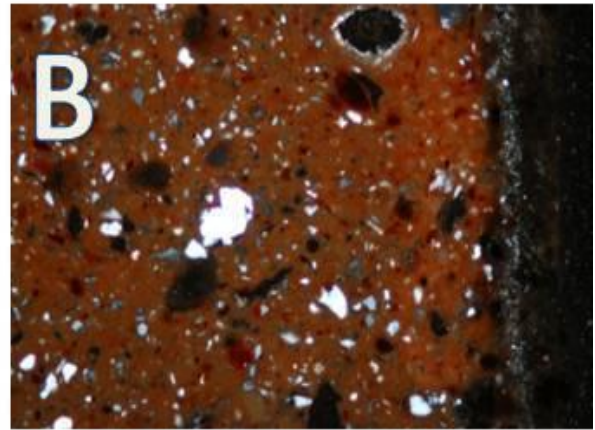
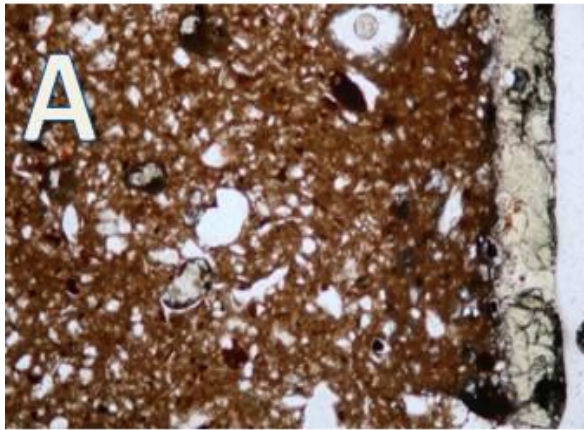


Photo micrographs showing the texture and non-plastic inclusions in sample UQ7. a: the homogeneous matrix and the glaze layer chemically combined by (PPL) mode, image width 1mm. b: same image by (PPL) mode, image width 1mm.

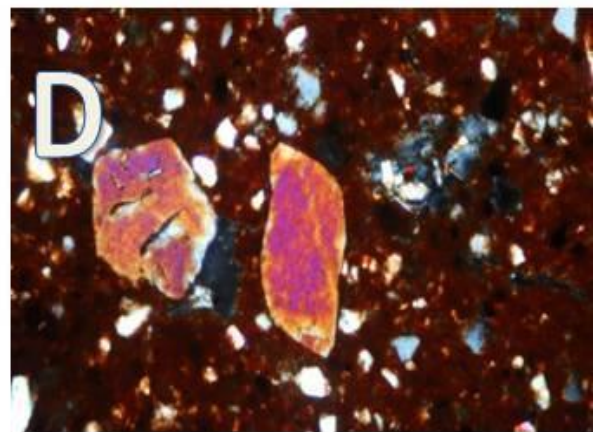
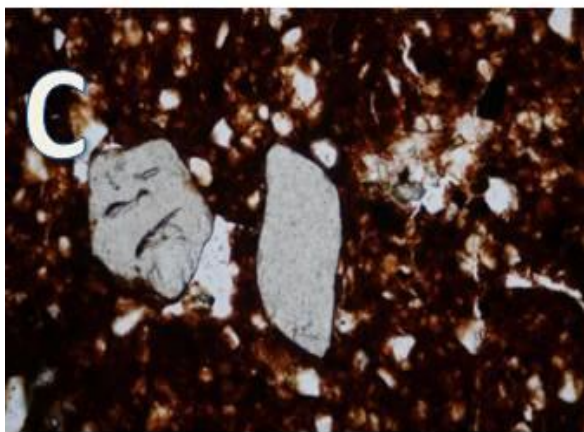
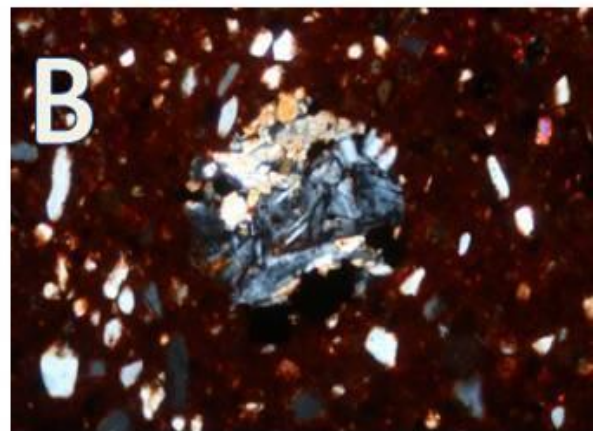
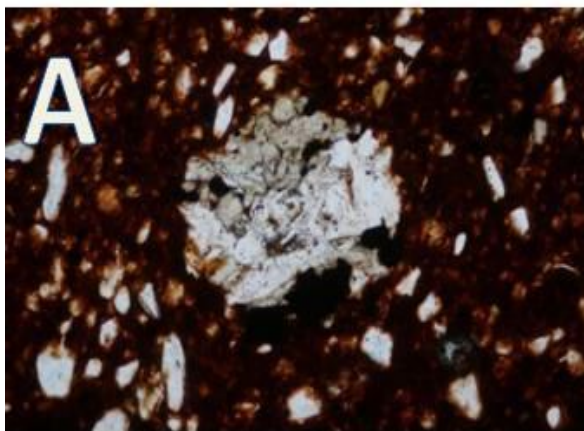


Photo micrographs showing the texture and non-plastic inclusions in sample UQ13. a: plagioclase basaltic clast with frequent fine quartz by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, image width 0.5mm. C: sub-rounded quartz and basaltic clasts by (PPL) mode, image width 0.5mm D: same image by (CPL) mode, image width 0.5mm.

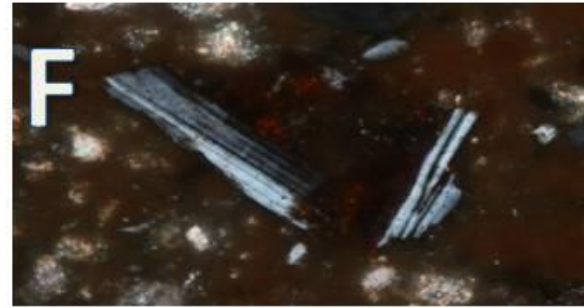
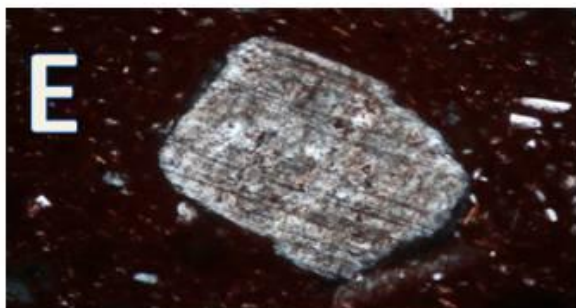
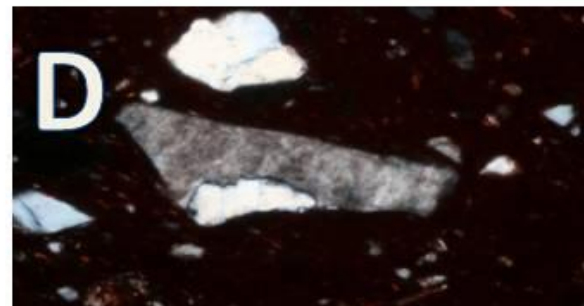
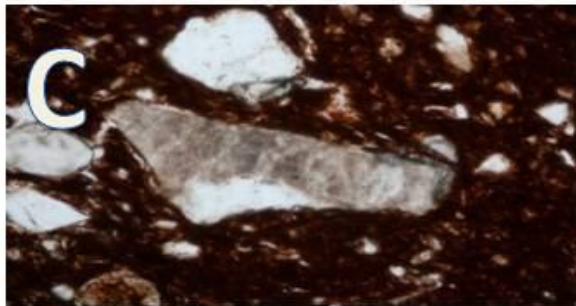
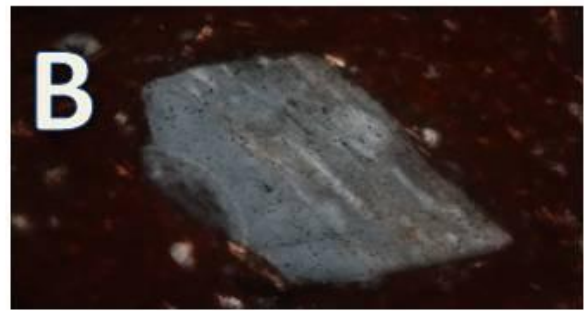
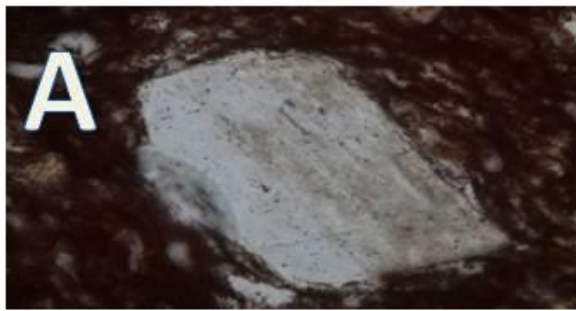


Photo micrographs showing the texture and non-plastic inclusions in sample UQ16. a: k-feldspar clast its borders partially has reacted proposing firing temp. over than 1000°C by (PPL) mode, image width 0.2mm. b: same image by (CPL) mode, image width 0.2mm. C: angular k-feldspar clasts by (PPL) mode, image width 0.5mm D: same image by (CPL) mode, image width 0.5mm. E: k-feldspar twinning patterns by (CPL) mode, image width 0.5mm. E: plagioclase twinning by CPL mode, image width 0.2mm.

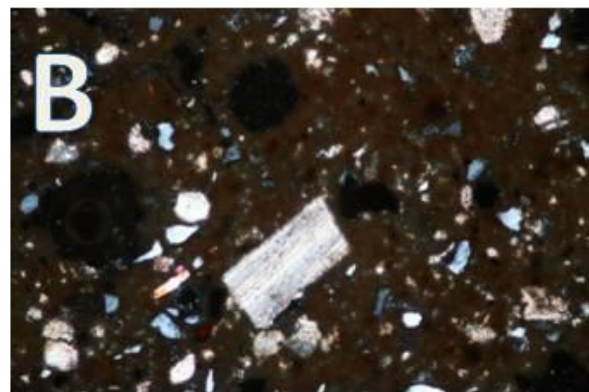
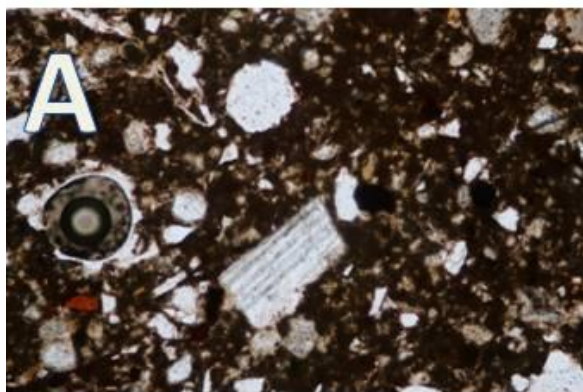


Photo micrographs showing the texture and non-plastic inclusions in sample UQ17. a: primary calcite clast with lamellar twinning clear . by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, , image width 0.5mm.

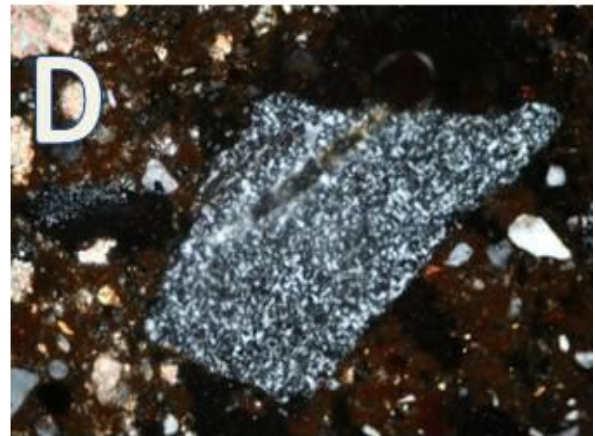
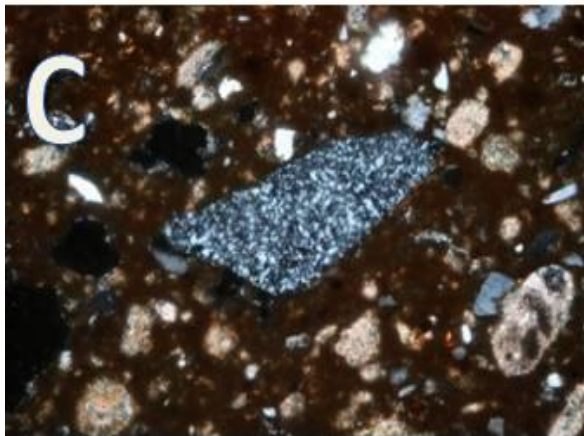
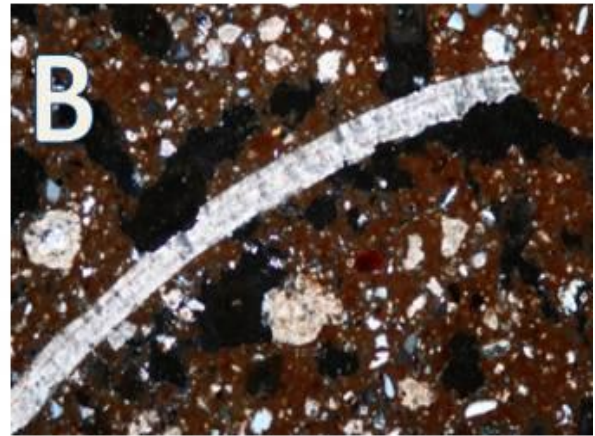
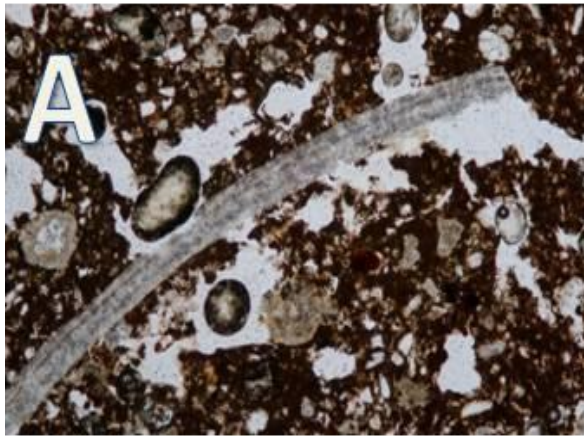


Photo micrographs showing the texture and non-plastic inclusions in sample UQ17. A: micro-fossil indicating undisturbed calcite by (PPL) mode, image width 1mm B:same image in (CPL) mode, image width 1mm. C: rock clast quartzite by (CPL) mode, image width 0.5mm. D: larger rock clast quartzite image in (CPL)mode, image width 0.5mm.

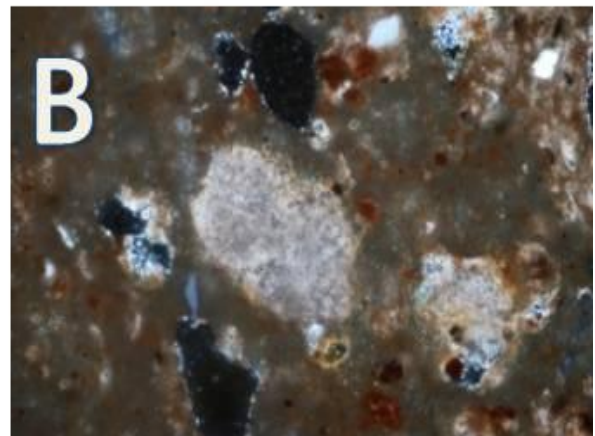
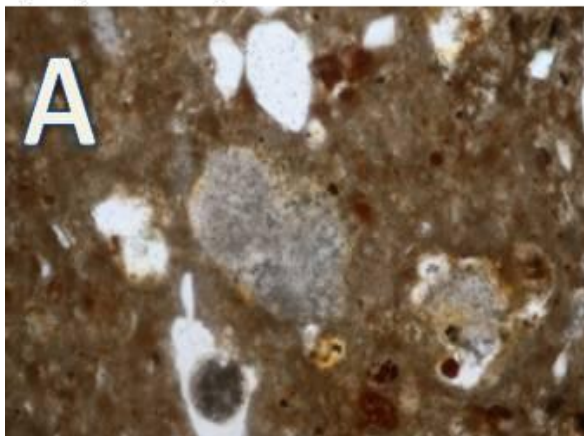


Photo micrographs showing the texture and non-plastic inclusions in sample UQ20. A: highly fired matrix with calcined limestone and secondary calcite precipitated by (PPL) mode, image width 0.5mm B:same image in (CPL) mode, image width 0.5mm.

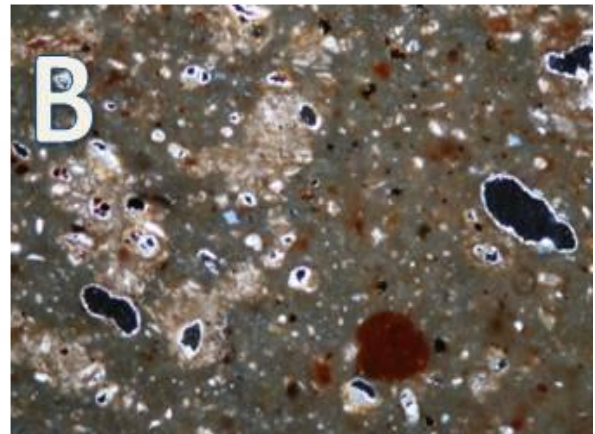
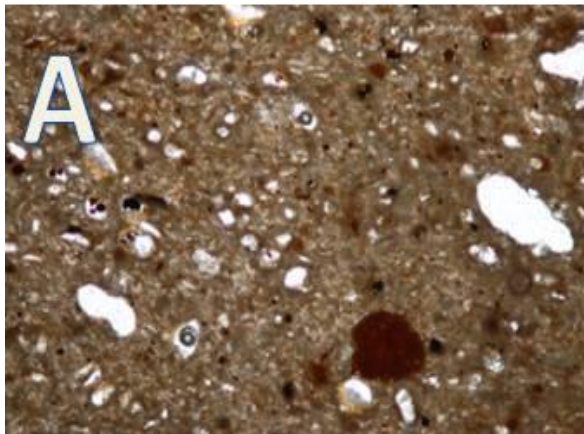


Photo micrographs showing the texture and non-plastic inclusions in sample UQ20. A: secondary calcite precipitated around the pores and red spots related to iron by (PPL) mode, image width 1mm B:same image in (CPL) mode, image width 1mm.

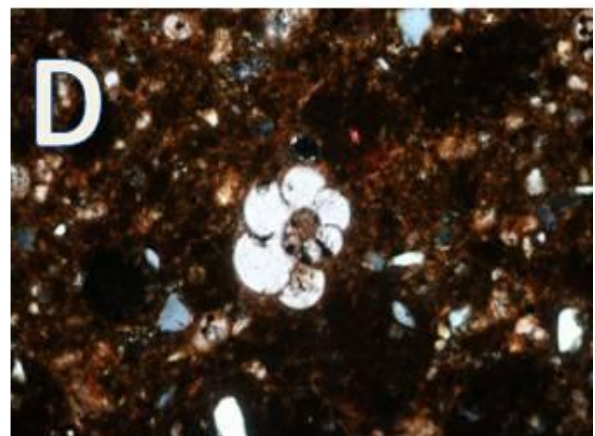
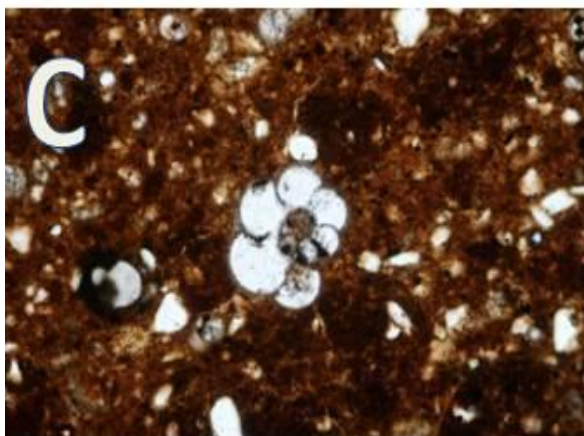
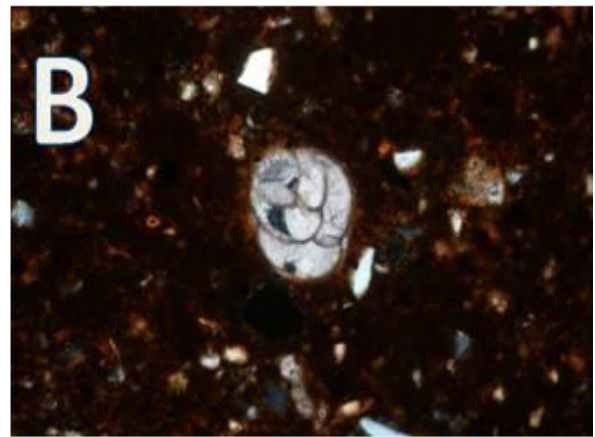
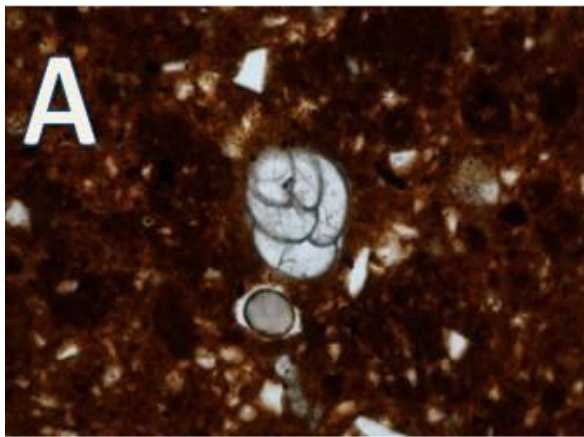


Photo micrographs showing the texture and non-plastic inclusions in sample UQ27. A: micro-fossil foraminifera indicating undisturbed calcite and origin of clayey materials by (PPL) mode, image width 0.5mm. B:same image in (CPL) mode, image width 0.5mm. C: different shape of microfossil by (CPL) mode, image width 0.5mm. D: same image by (CPL) mode, image width 0.5mm.

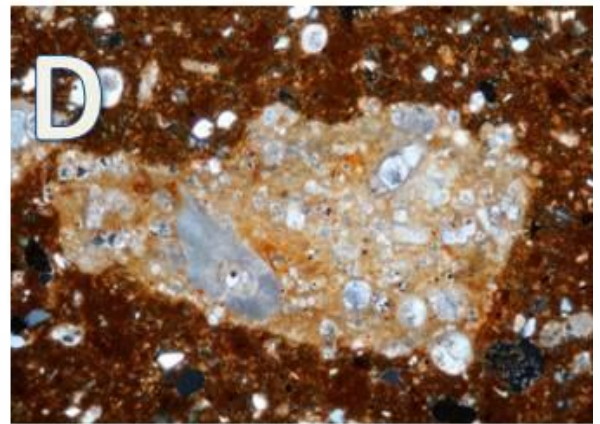
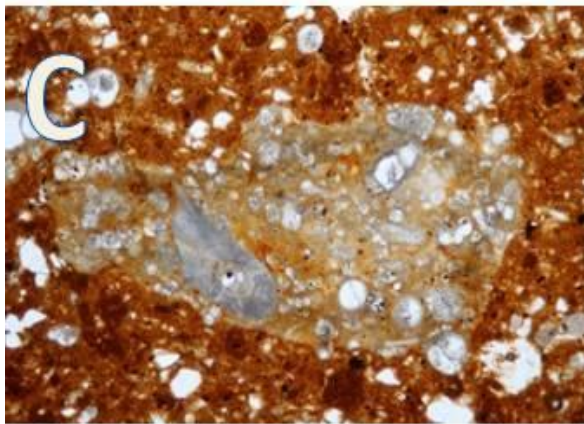
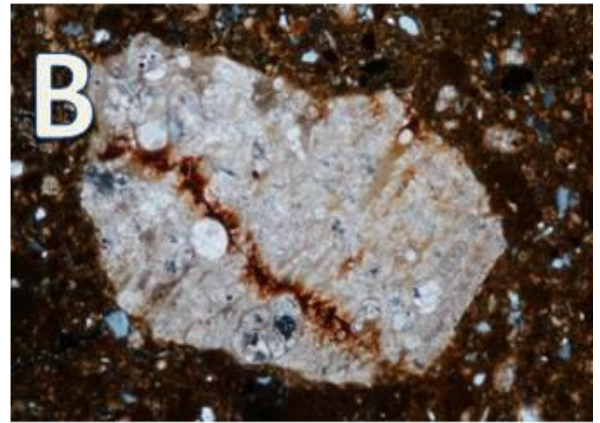
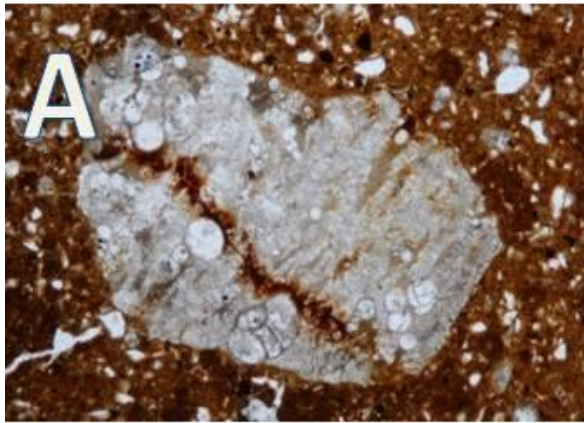


Photo micrographs showing the texture and non-plastic inclusions in sample UQ27. A: micro-fossil foraminifera in coarse clast of Micritic limestone indicating undisturbed calcite and origin of clayey materials by (PPL) mode, image width 0.5mm. B: same image in (CPL) mode, image width 0.5mm. C: one more micritic limestone clast with comb like microfossil by (PPL) mode, image width 1mm. D: same image by (CPL) mode, image width 1mm.

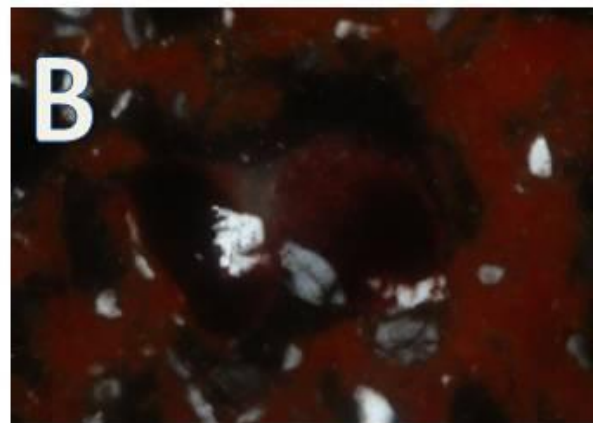
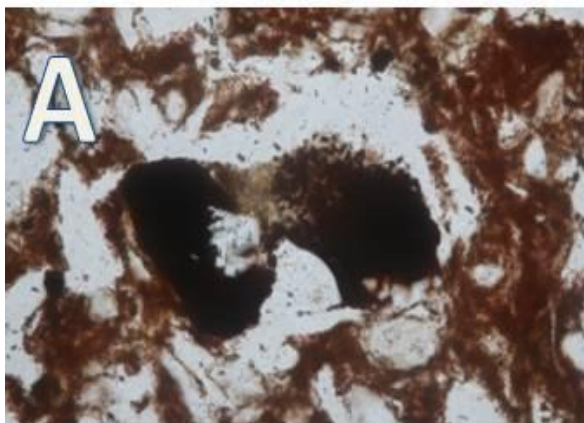


Photo micrographs showing the texture and non-plastic inclusions in sample UQ28. a: sintered matrix rich with black spots related to iron (spinel) by (PPL) mode, image width 0.2mm. b: same image but in (CPL) mode, image width 0.2mm.

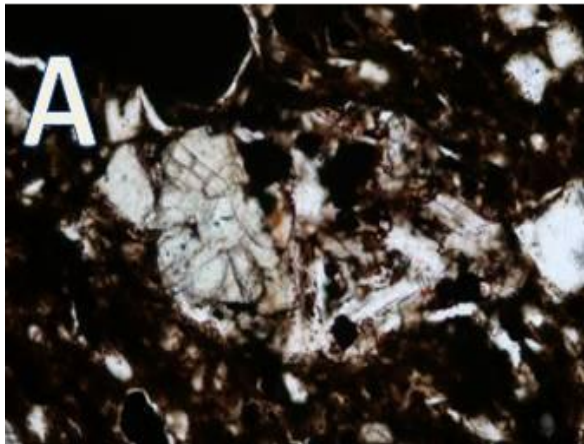


Photo micrographs showing the texture and non-plastic inclusions in sample UQ30. a: fine fine basaltic clast by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, image width 0.5mm.

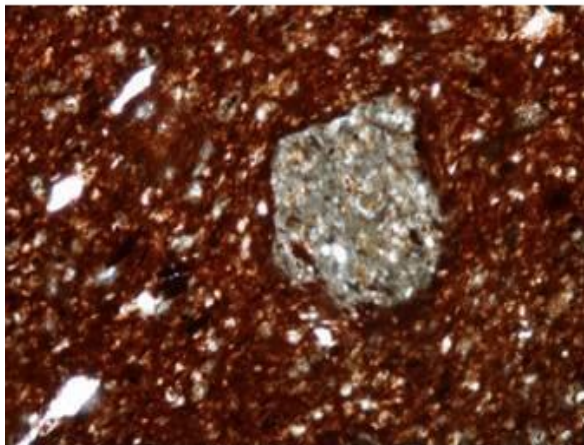


Photo micrographs showing the texture and rock clast as non-plastic inclusions in sample UQ31.

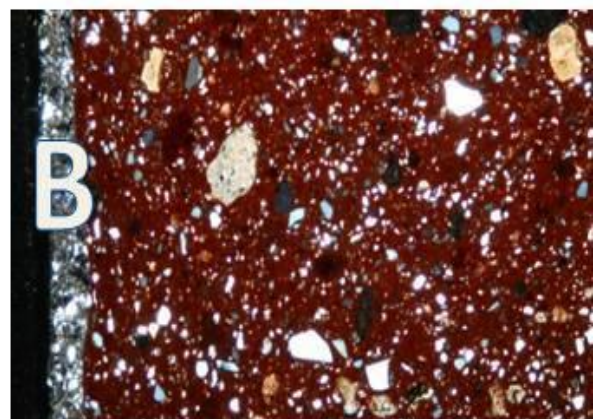
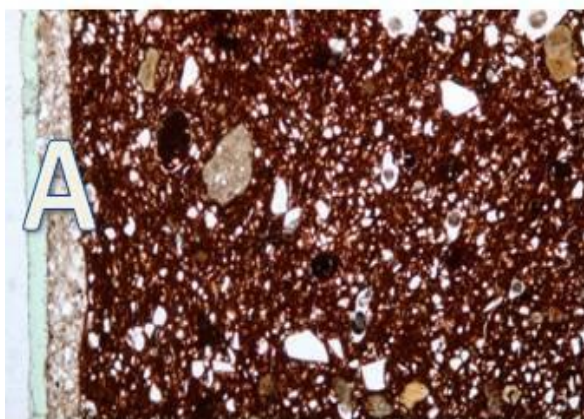


Photo micrographs showing the texture and non-plastic inclusions in sample UQ44. a: fine matrix contains grog and quartz clasts and showing the preparation for the glaze layer by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

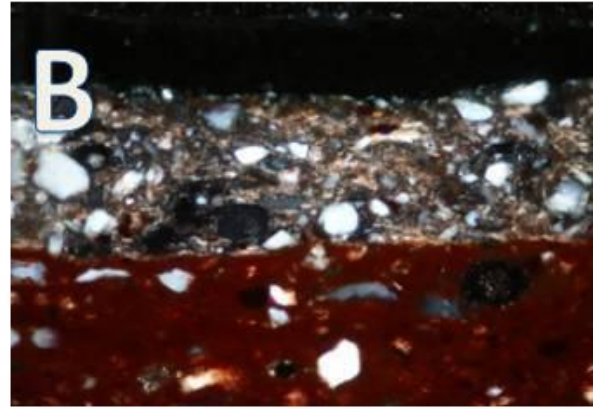
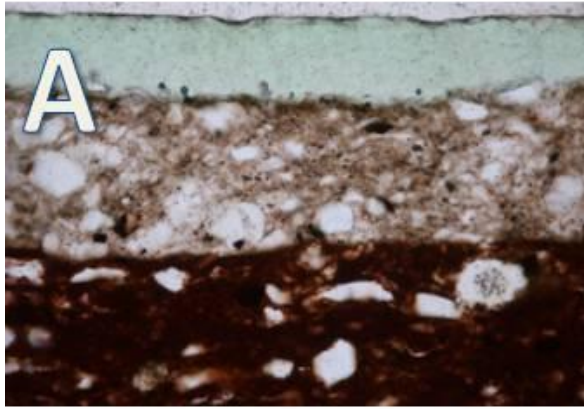


Photo micrographs showing the texture and non-plastic inclusions in sample UQ44. a: close up showing the different raw materials between the preparation layer and the original matrix by (PPL) mode, image width 0.5mm B: same image but in (CPL) mode, image width 0.5mm.

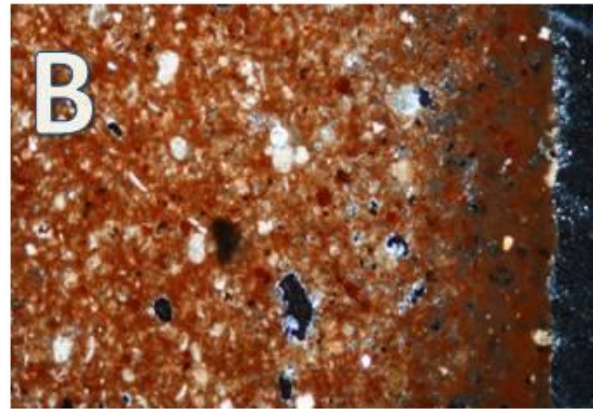
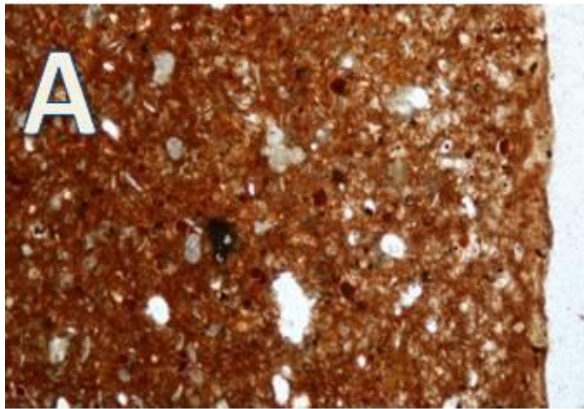


Photo micrographs showing the texture and non-plastic inclusions in sample UQ61. a: homogeneous matrix with plenty of undisturbed microfossils with glaze layer, indicating glaze by low firing temperatures by (PPL) mode, image width 1mm B: same image but in (CPL) mode, image width 1mm.

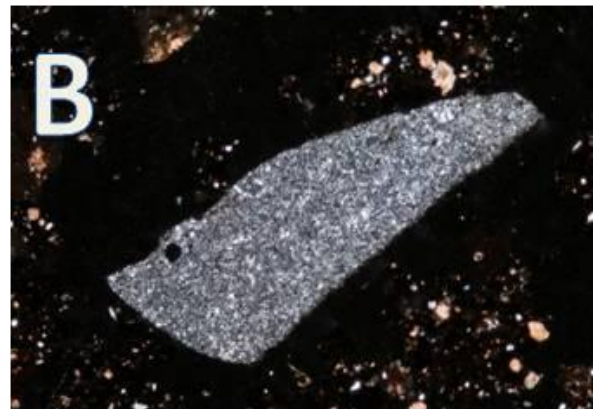
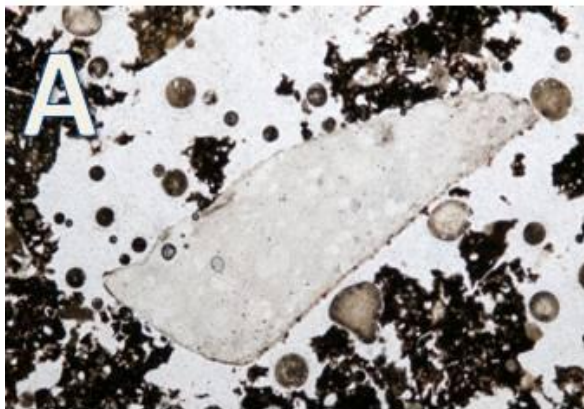


Photo micrographs showing the texture and non-plastic inclusions in sample UQ73. a: coarse quartzite clast has sub-rounded shape by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

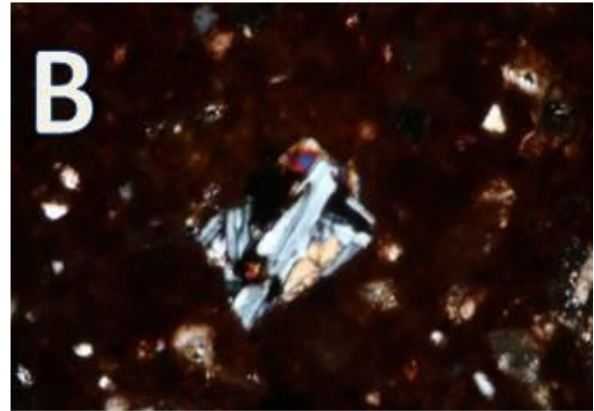
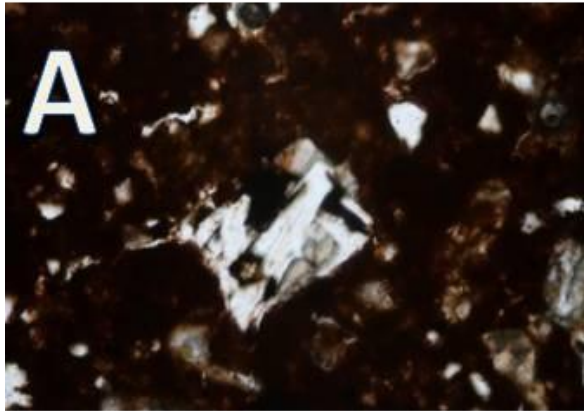


Photo micrographs showing the texture and non-plastic inclusions in sample UQ73. a: fine plagioclase (basaltic) clast by (PPL) mode, image width 0.5mm B: same image but in (CPL) mode, image width 0.5mm.

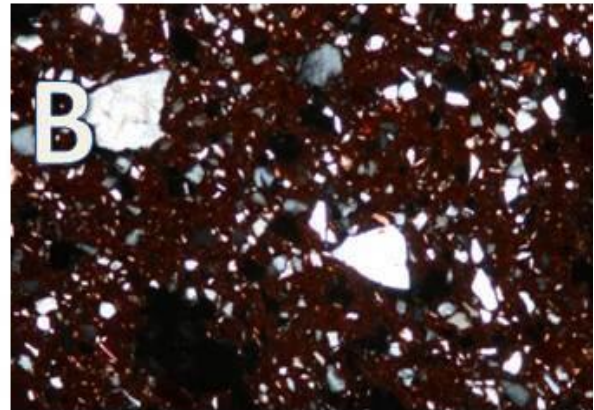
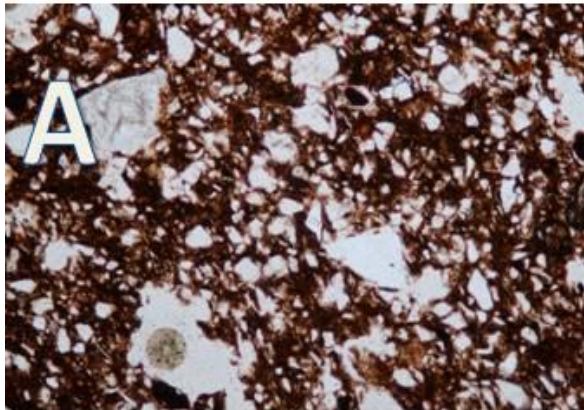


Photo micrographs showing the texture and non-plastic inclusions in sample UQ76. a: high concentration of angular quartz clasts temper materials by (PPL) mode, image width 1mm. b: same image but in (CPL) mode, image width 1mm.

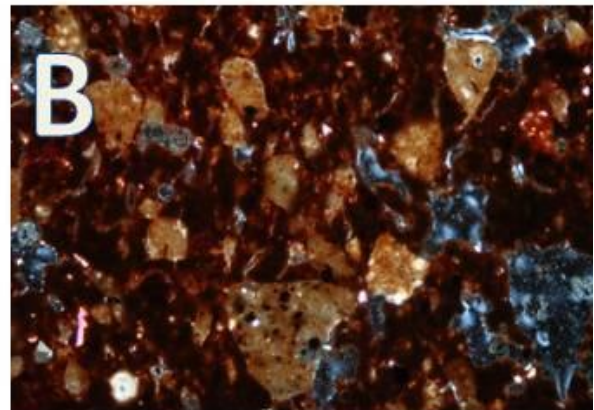
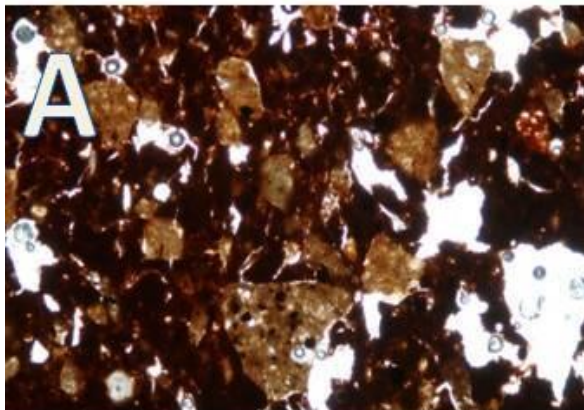


Photo micrographs showing the texture and non-plastic inclusions in sample UQ77. a: highly sintered matrix with many angular quartz clasts by (PPL) mode, image width 2mm. b: same image but in (CPL) mode, image width 2mm.

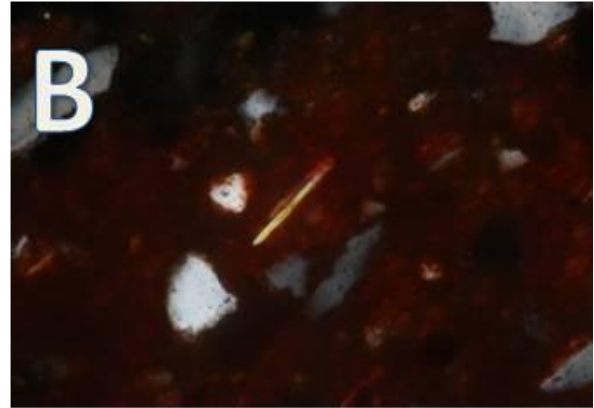
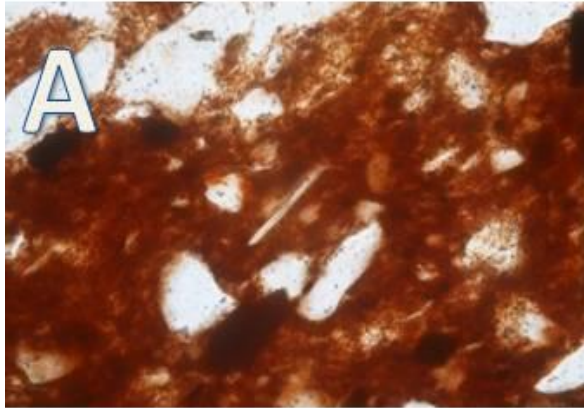


Photo micrographs showing the texture and non-plastic inclusions in sample UQ88. a: very fine mica flake by (PPL) mode, image width 0.2mm. b: same image by (CPL) mode, image width 0.2mm.

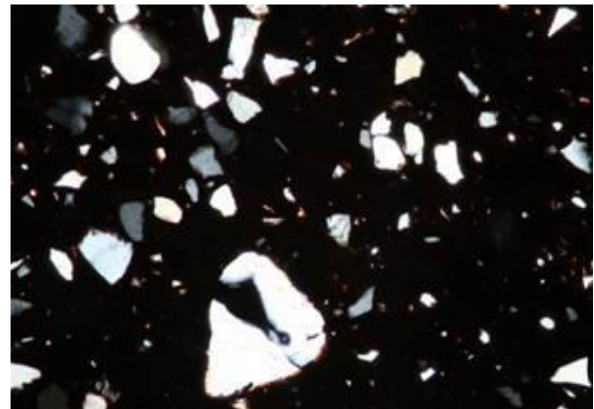
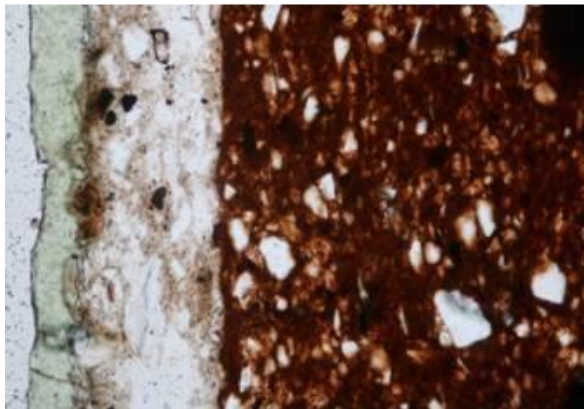


Photo micrographs showing the texture and non-plastic inclusions and lime wash layer in sample UQ88. by (PPL) mode, image width 0.5mm.

Photo micrographs showing the high frequency of angular quartz clast as non-plastic inclusions in sample UQ95.



Photo micrographs showing the texture and non-plastic inclusions in sample UQ115. a: mixing two types of clayey materials by (PPL) mode, image width 4mm. b: same image but in (CPL) mode, image width 4mm.

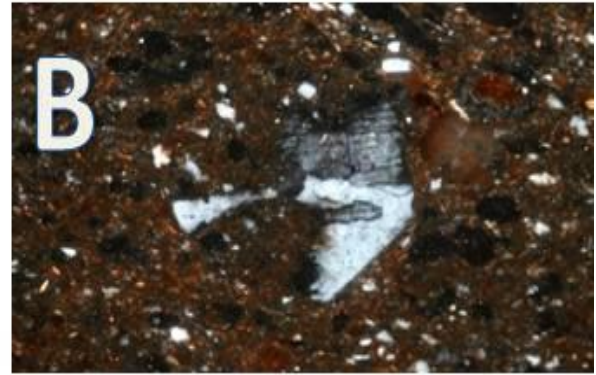


Photo micrographs showing the texture and non-plastic inclusions in sample UQ127. a: k-feldspar in a matrix contain bearing quantity of reddish iron spots by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, , image width 0.5mm.

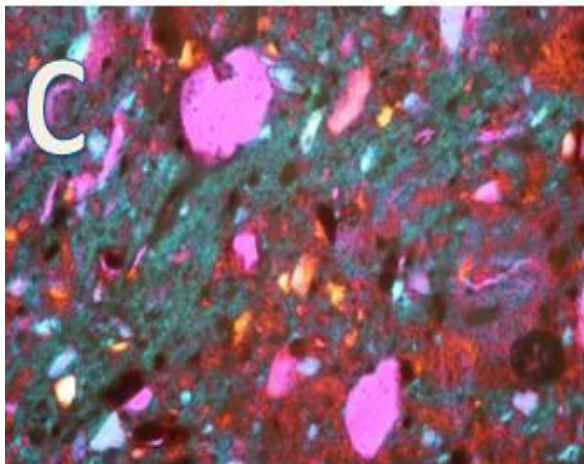
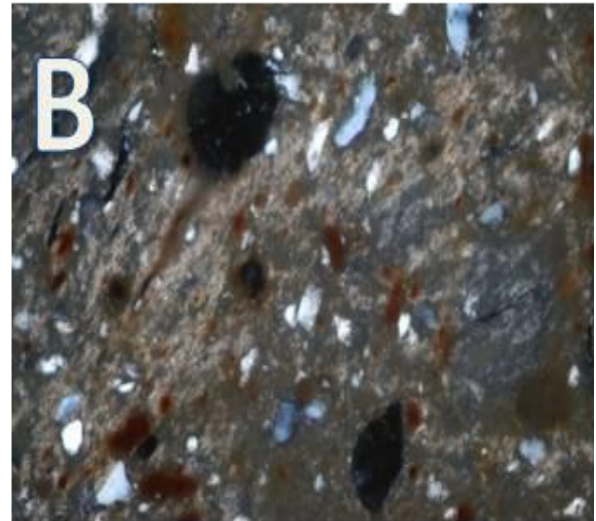
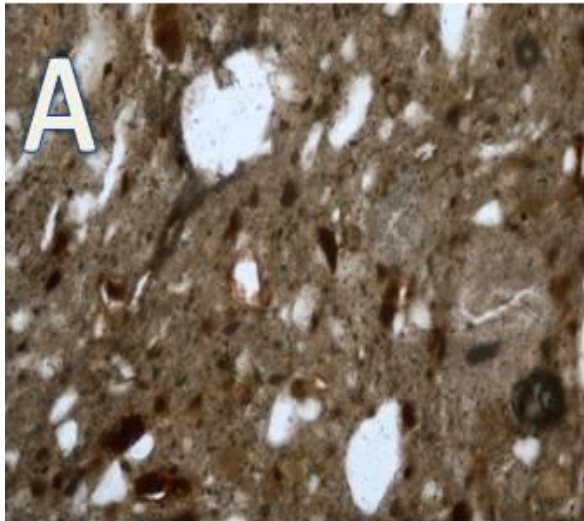


Photo micrographs showing the texture and non-plastic inclusions in sample UQ130. a: mullite bearing matrix (highly sintered) by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, , image width 0.5mm. C: same image with lambda plate demonstrating mullite veins by (CPL) mode, image width 0.5mm

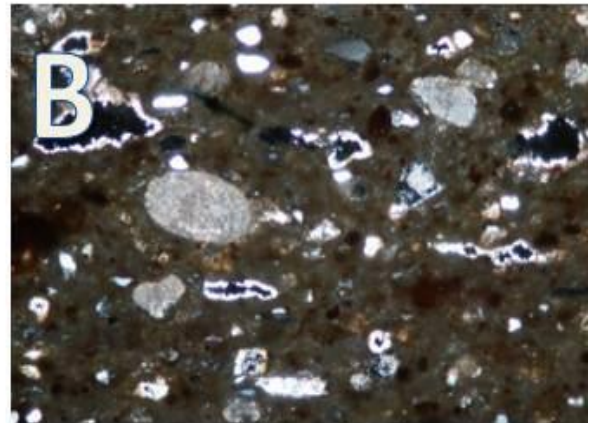
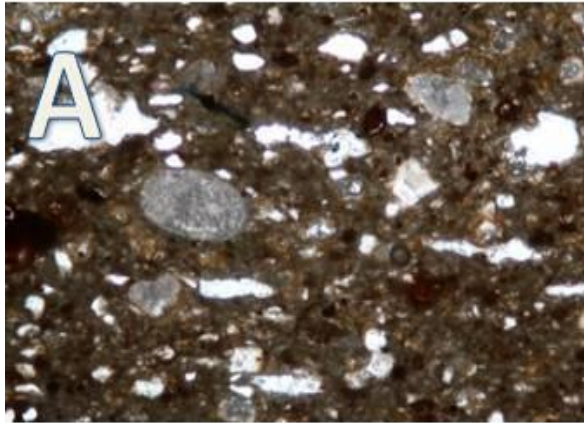


Photo micrographs showing the texture and non-plastic inclusions in sample UQ136. a: plenty of reacted calcite and many secondary calcite by (PPL) mode, image width 1mm. b: same image but in (CPL) mode, image width 1mm.

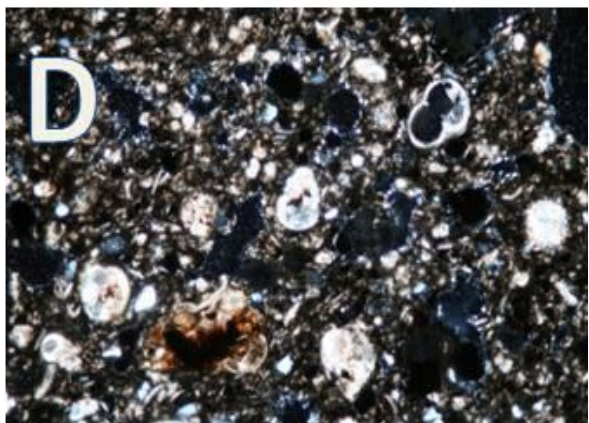
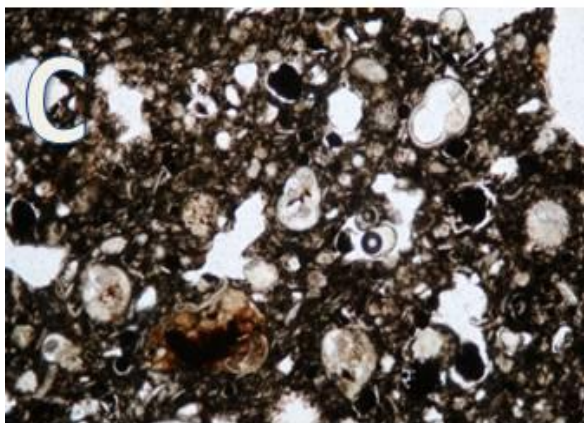
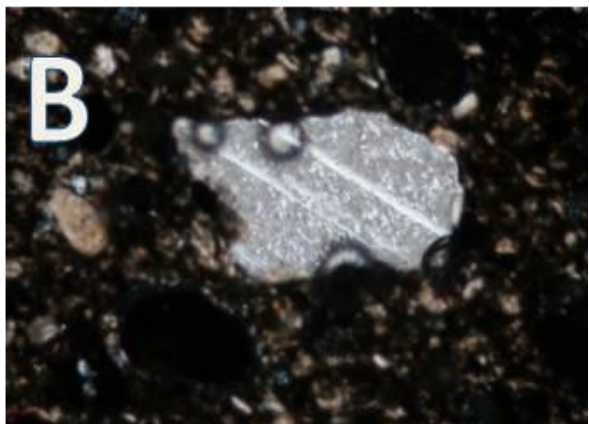
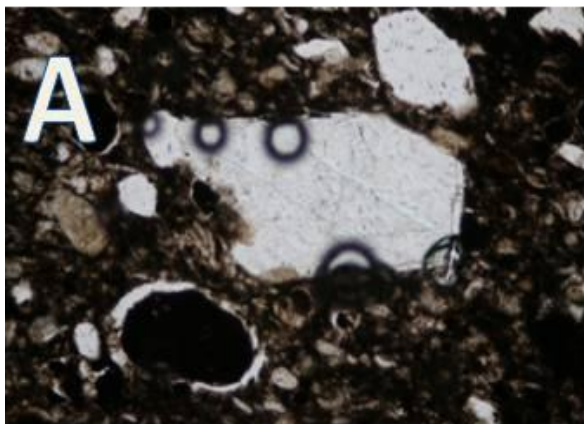


Photo micrographs showing the texture and non-plastic inclusions in sample UQ137. a: angular calcite clast with clear twinning in a dark matrix by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, image width 0.5mm. C: micro-fossils undisturbed by (PPL) mode, image width 1mm D: same image but in (CPL) mode, image width 1mm.

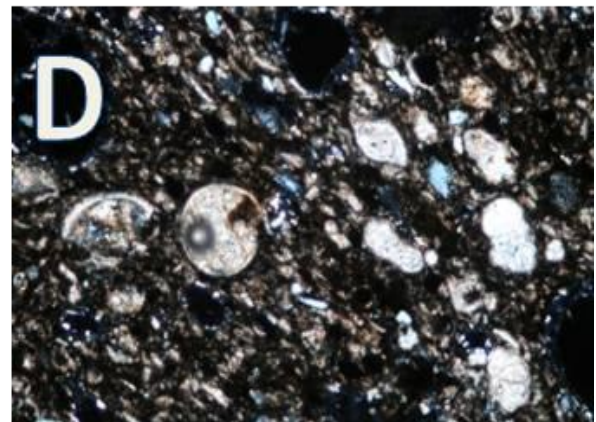
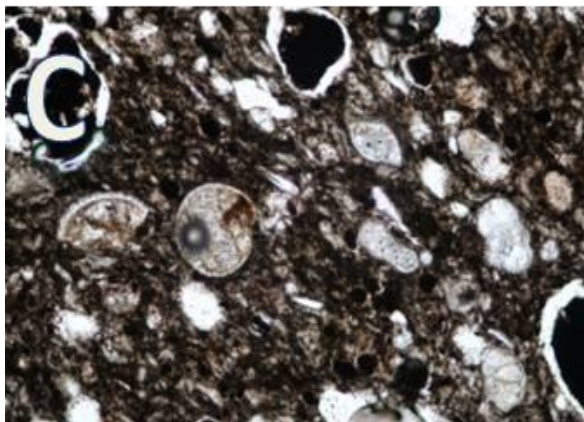
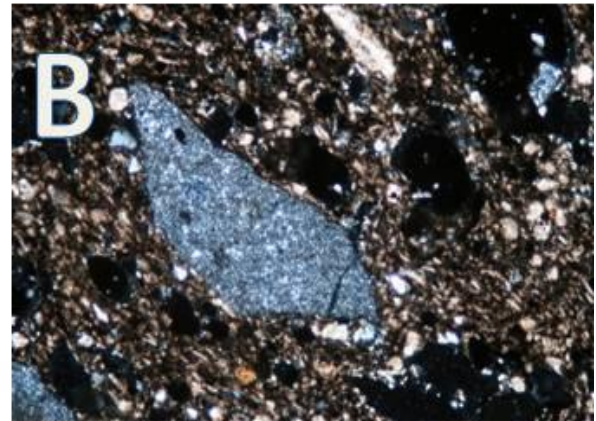
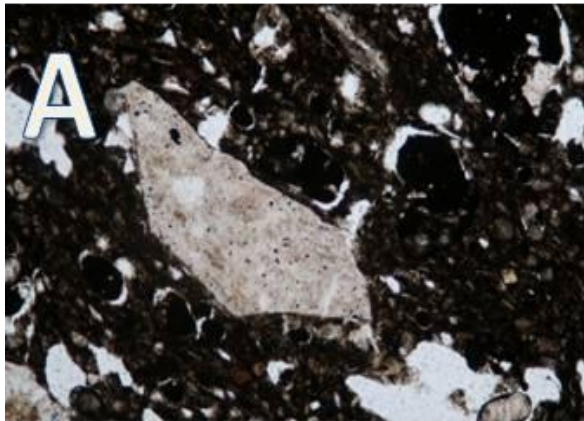


Photo micrographs showing the texture and non-plastic inclusions in sample UQ137. a: angular chert (flint) clasts in a dark matrix by (PPL) mode, image width 1mm. b: same image but in (CPL) mode, image width 1mm. C: micro-fossils undisturbed by (PPL) mode, image width 0.5mm D: same image but in (CPL) mode, image width 0.5mm.

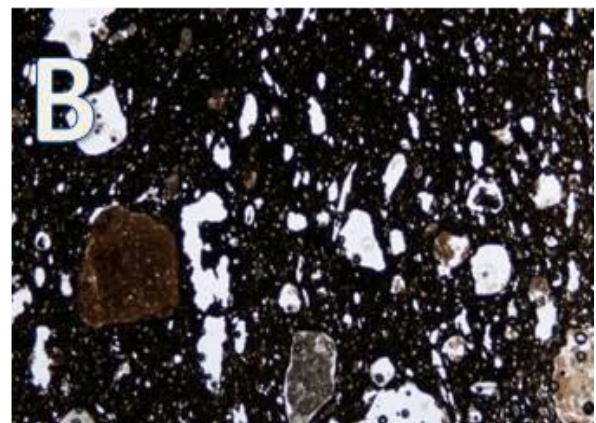
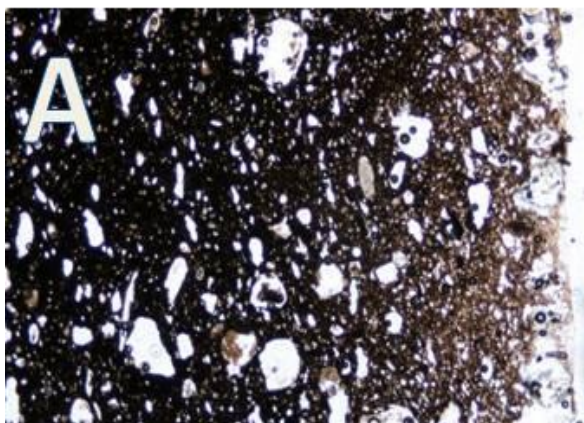


Photo micrographs showing the texture and non-plastic inclusions in sample UQ138. a: dark matrix showing different redox ratios and the glaze layer is clear at the right side of the image by (PPL) mode, image width 4mm. b: coarse clasts of primary calcite with clear fossil traces by (PPL) mode, image width 4mm.

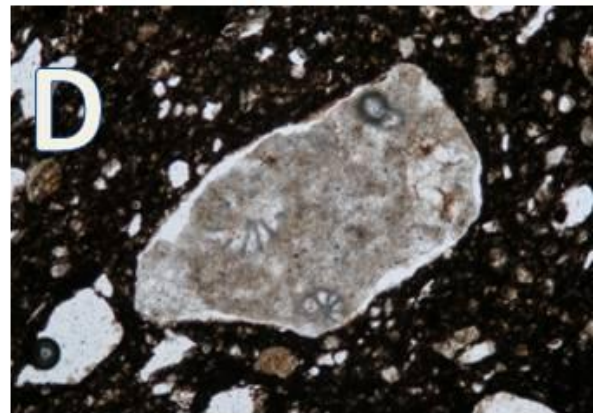
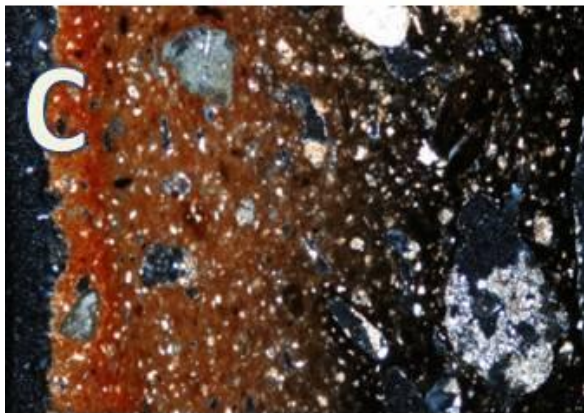
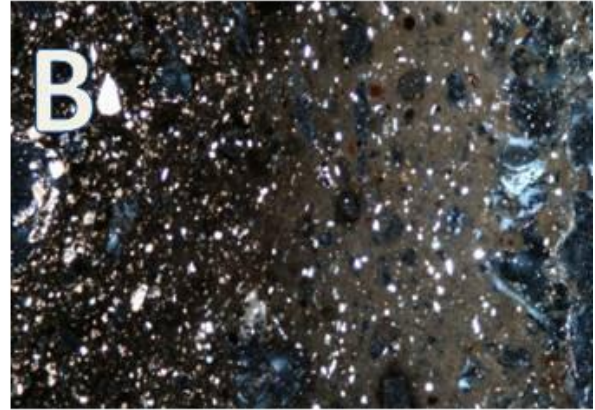
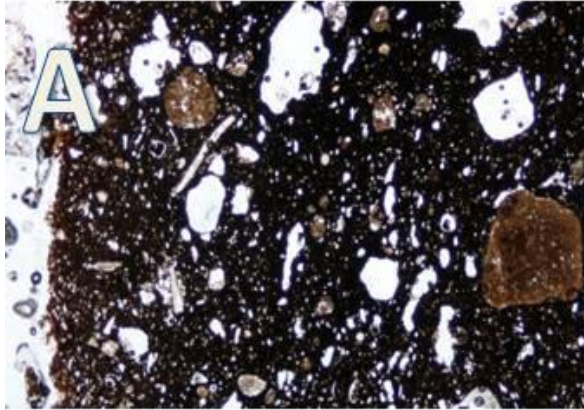


Photo micrographs showing the texture and non-plastic inclusions in sample UQ138. A: different microfossil indicating undisturbed calcite and grog fragment beside the glaze layer at left side of the image by (PPL) mode, image width 4mm B plenty of fine calcite and quartz clasts by (CPL) mode, image width 2mm. C: primary calcite by (CPL) mode, image width 2mm. D: larger calcite clast indicating fossils traces image in (CPL) mode, image width 1mm.

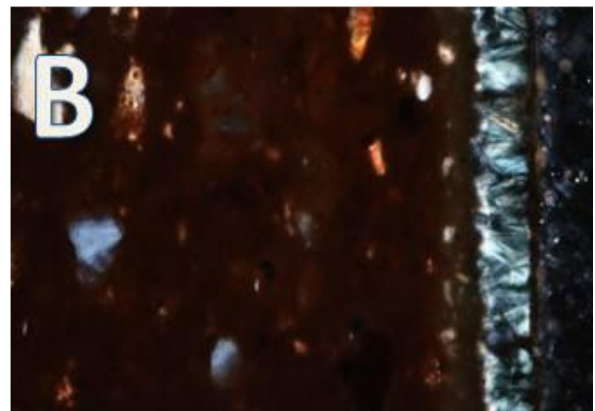
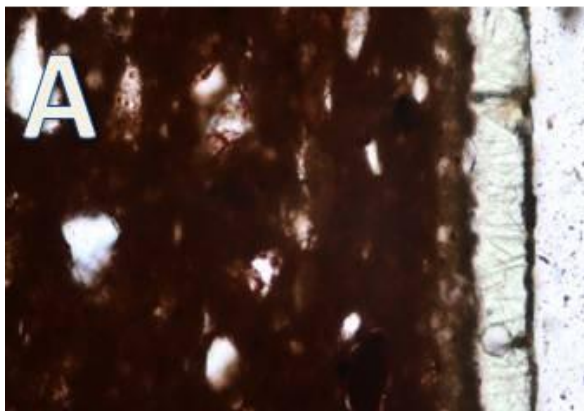


Photo micrographs showing the texture and non-plastic inclusions in sample UQ147. a: partially crystallized glaze layer by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, image width 0.5mm.

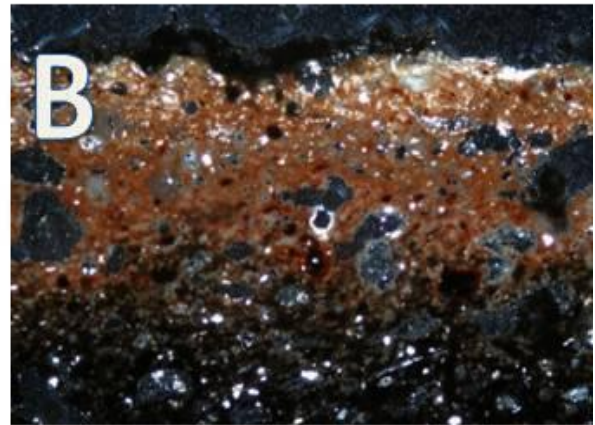
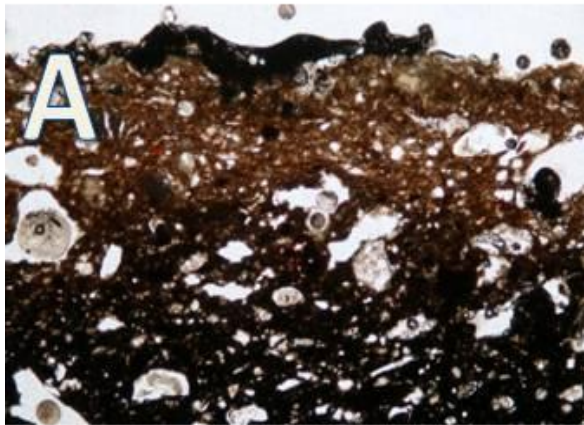


Photo micrographs showing the texture and non-plastic inclusions in sample UQ152. a: dark matrix showing different pores and redox ratios by (PPL) mode, image width 4mm. b: same image by (CPL) mode, image width 4mm.

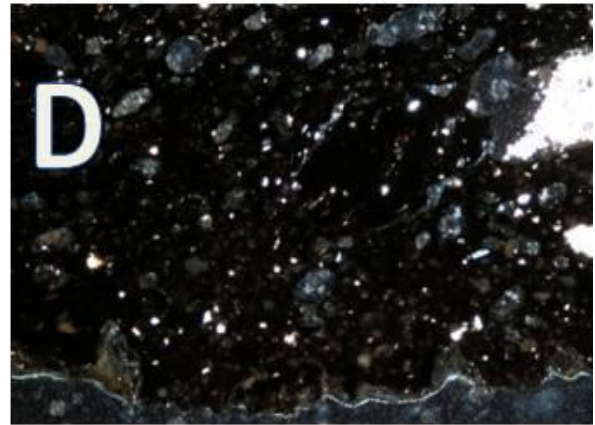
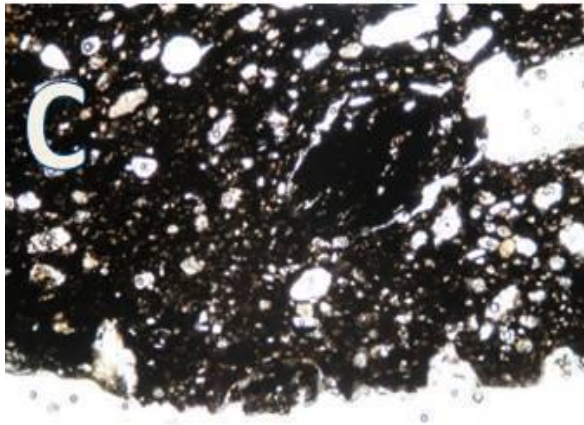
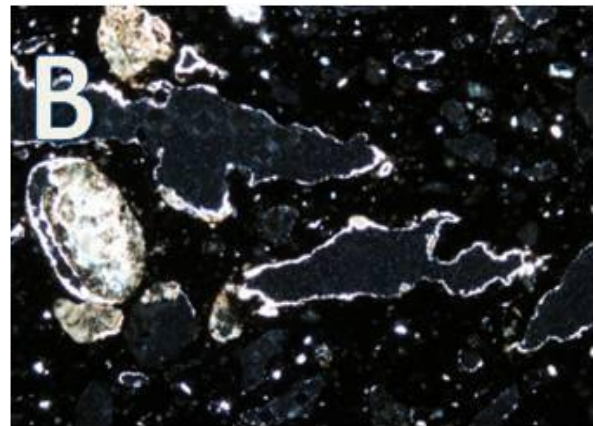
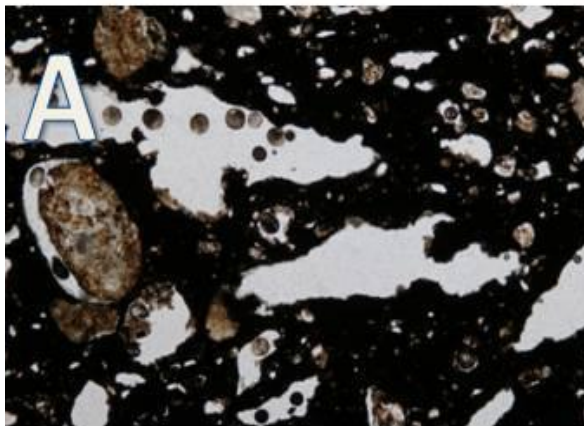


Photo micrographs showing the texture and non-plastic inclusions in sample UQ152. a: large pores due to loss of some raw materials by (PPL) mode, image width 4mm B: fine calcite remnant around the pores by (CPL) mode, image width 4mm. C: very high pores matrix by (PPL) mode, image width 4mm. D: same image by (CPL) mode, image width 4mm.

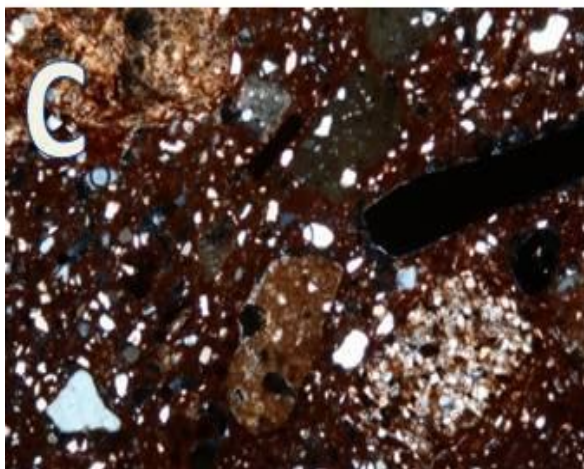
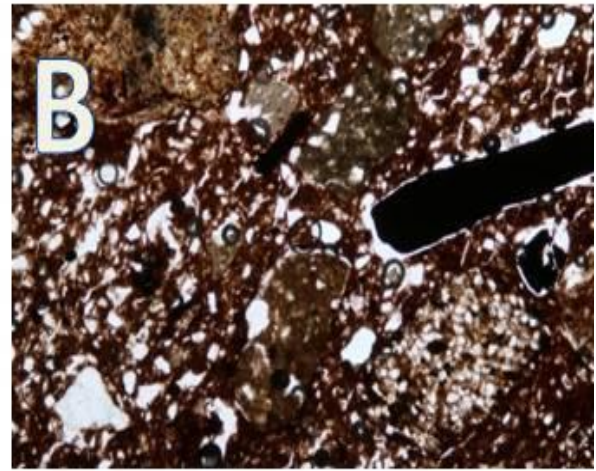
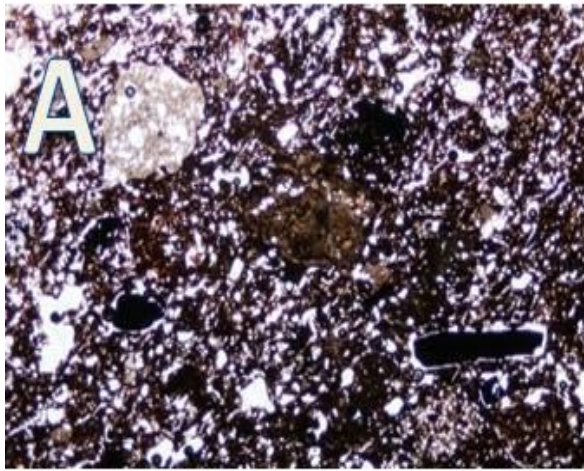


Photo micrographs showing the texture and non-plastic inclusions in sample UQ157. a: coarse grog, rock clast, and elongated black spots related to iron (spinel) by (PPL) mode, image width 4mm. b: same close up image showing sandstone clast by (PPL) mode, , image width 2mm. C: same image showing many grog clasts beside the sandstone clast by (PPL) mode, image width 2mm.

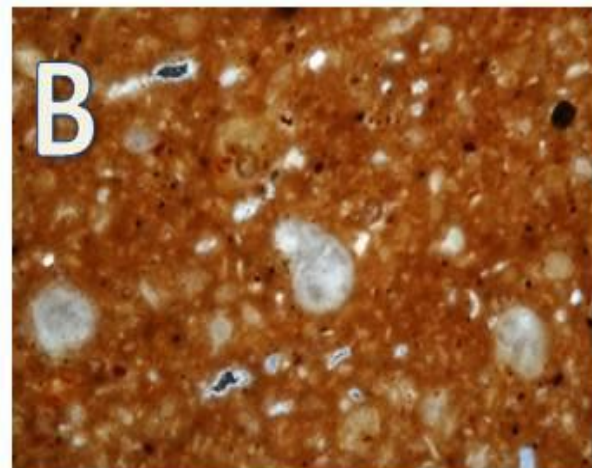
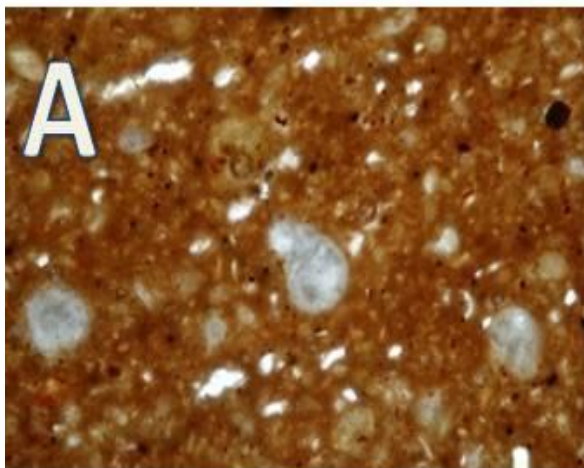


Photo micrographs showing the texture and non-plastic inclusions in sample UQ163. a: homogenous highly fired matrix with many microfossils over reacted by (PPL) mode, image width 1mm. b: same image by (CPL)mode, , image width 1mm.

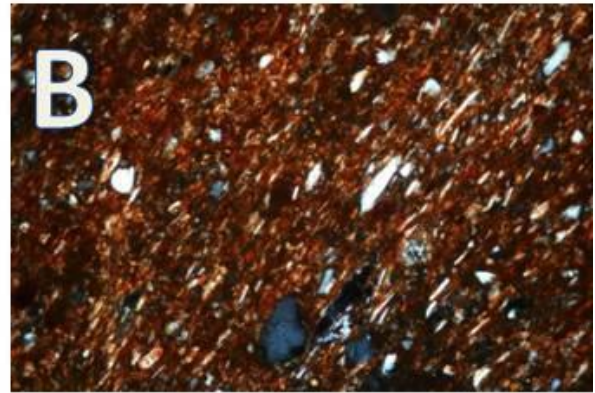
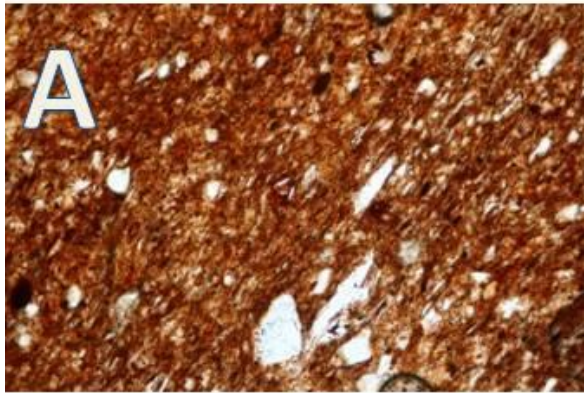


Photo micrographs showing the texture and non-plastic inclusions in sample UQ172. a: plenty of mica flake (Muscovite) showing orientation by (PPL) mode, image width 0.2mm. b: same image but in (CPL) mode, , image width 0.2mm.

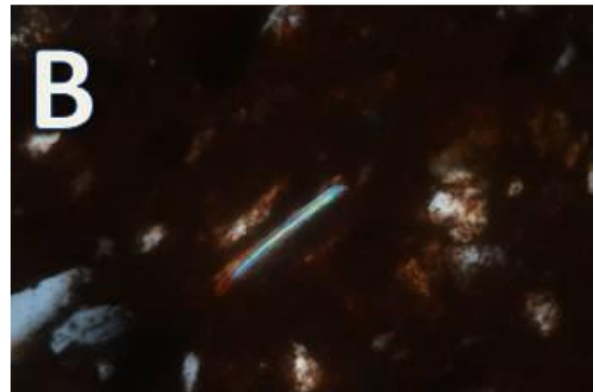
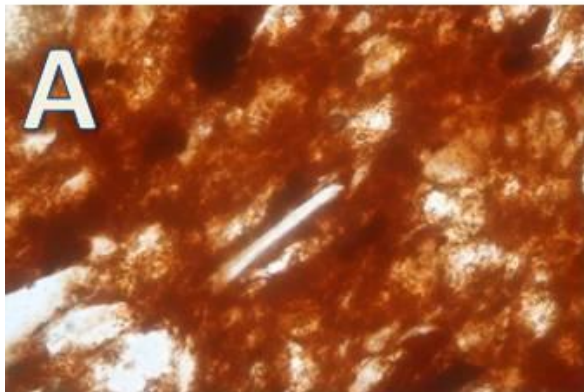


Photo micrographs showing the texture and non-plastic inclusions in sample UQ181. a: mica flake (Muscovite) by (PPL) mode, image width 0.2mm. b: same image but in (CPL) mode, , image width 0.2mm.

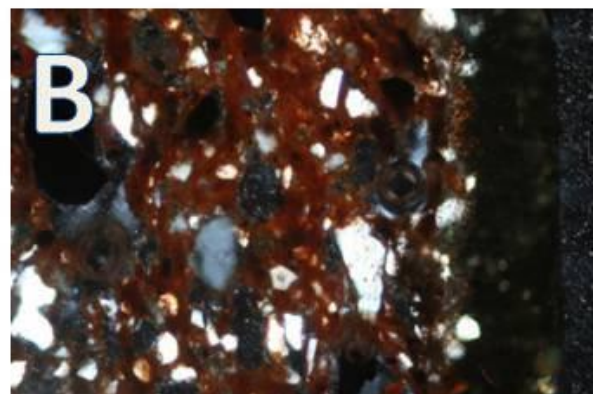


Photo micrographs showing the texture and non-plastic inclusions in sample UQ182. a: the diffusion of the glaze layer within the surface of the body and angular quartz clasts by (PPL) mode, image width 0.5mm. b: same by (CPL) mode, , image width 0.5mm.

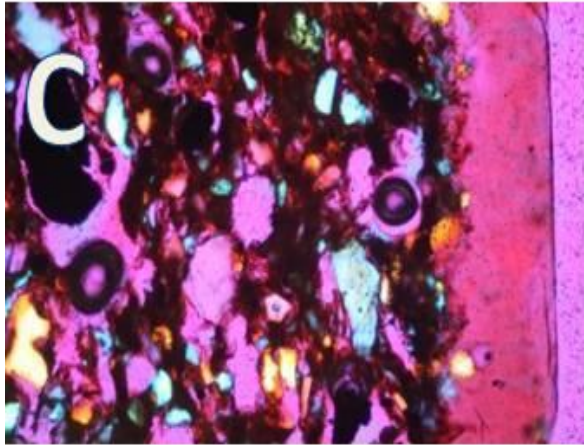


Photo micrographs of sample UQ182 showing the diffusion of the glaze layer within the surface of the body and angular quartz clasts by (CPL) mode with lambda plate, image width 0.5mm.

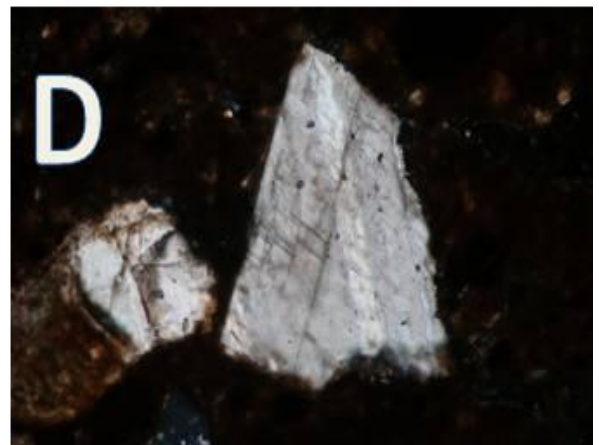
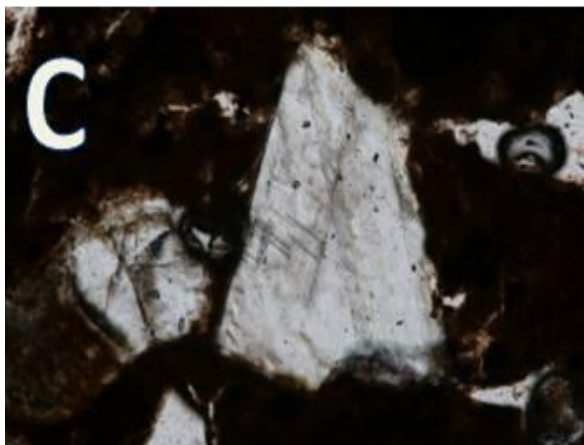
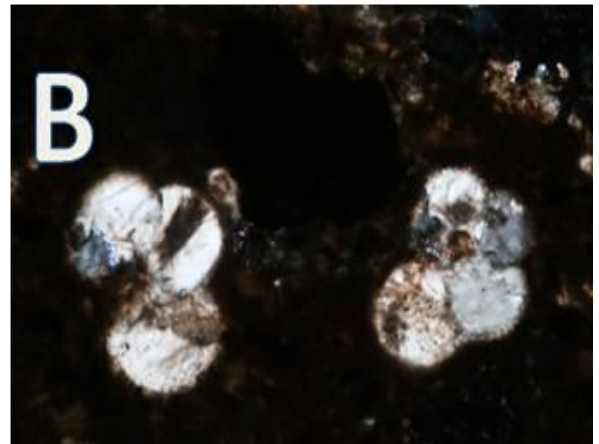
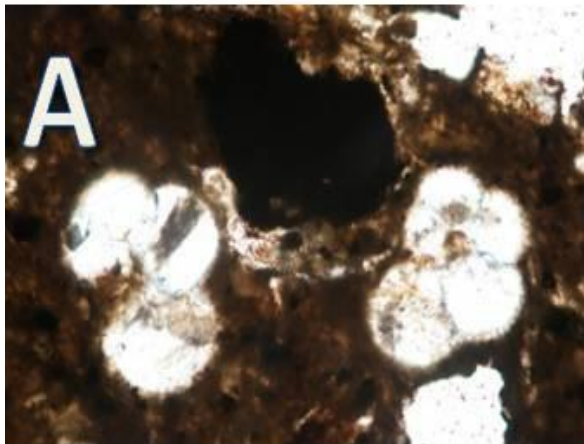


Photo micrographs showing the texture and non-plastic inclusions in sample UQ196. a: undisturbed microfossils in dark matrix by (PPL) mode, image width 0.5mm. b: same image but in (CPL) mode, image width 0.5mm. C: undisturbed primary calcite with clear twinning in dark matrix by (PPL) mode, image width 0.5mm. D: same image but in (CPL) mode, image width 0.5mm.

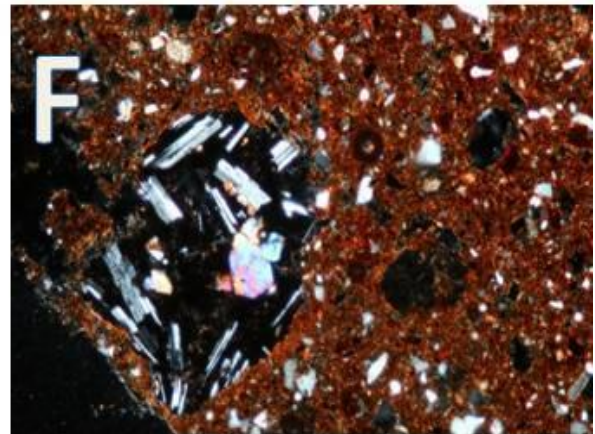
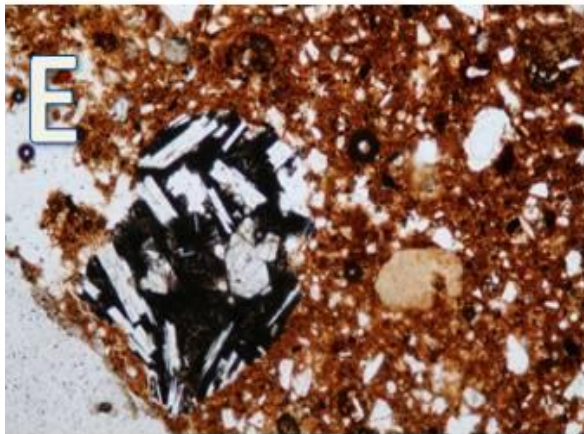
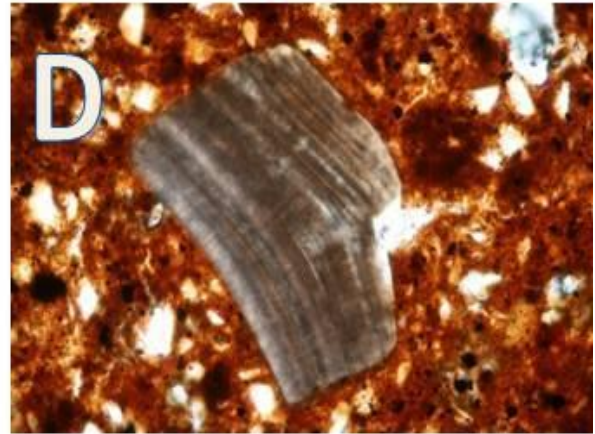
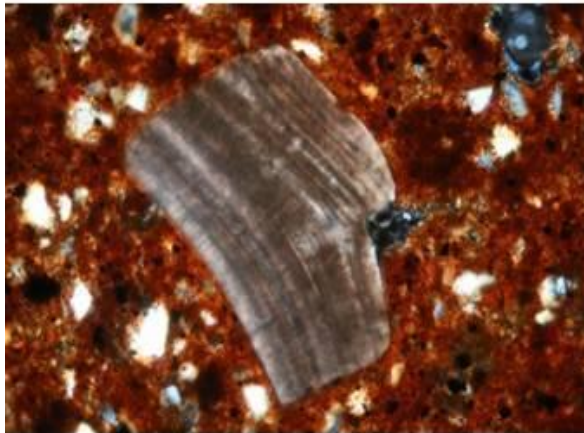
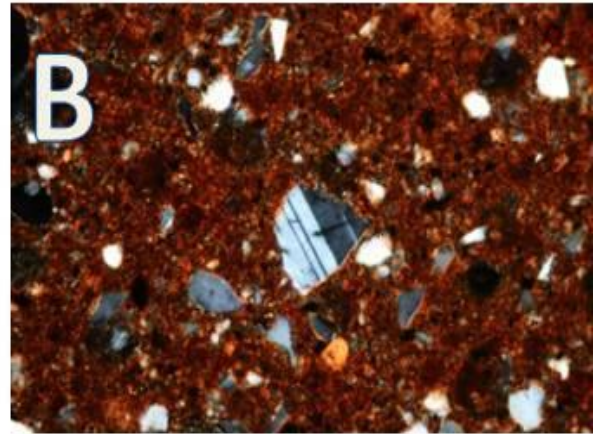
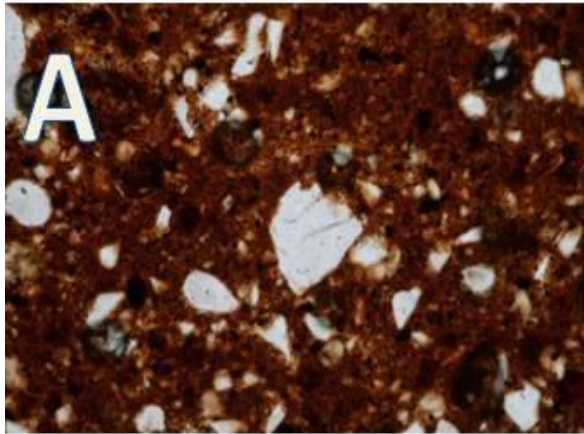


Photo micrographs showing the texture and non-plastic inclusions in sample UQ198. a: different angular clasts like quartz and plagioclase by (PPL) mode, image width 0.5mm B: same image showing the twinning of plagioclase by (CPL) mode, image width 0.5mm. C: bone fragment by (PPL) mode, image width 0.5mm. D: same image by (CPL) mode, image width 0.5mm. E: plagioclase (basaltic) clast by (PPL) mode, image width 1mm F: same image showing the twinning of plagioclase by (CPL) mode, image width 1mm.

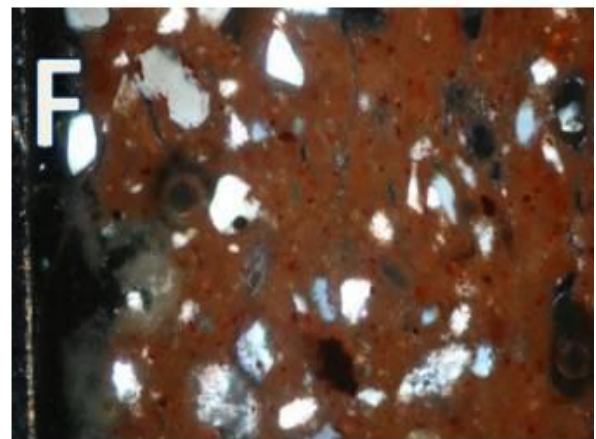
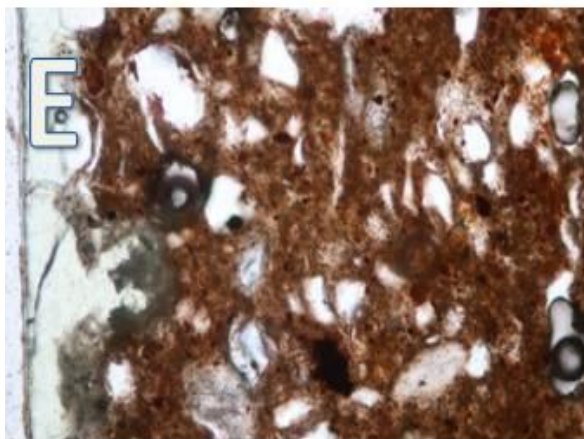
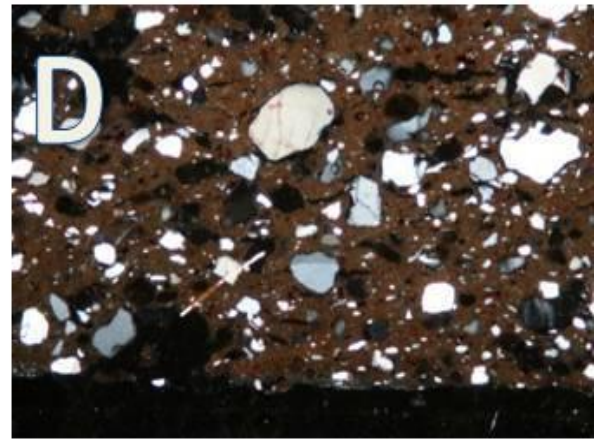
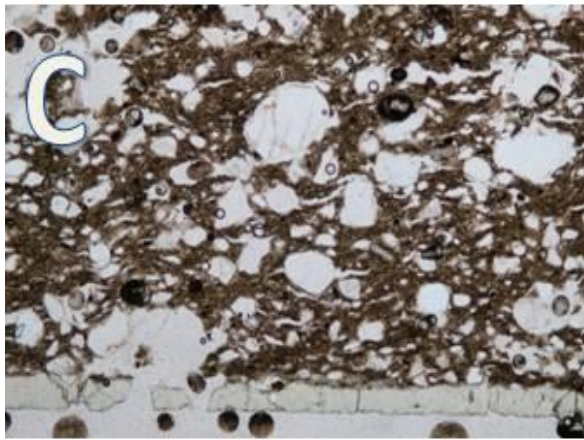
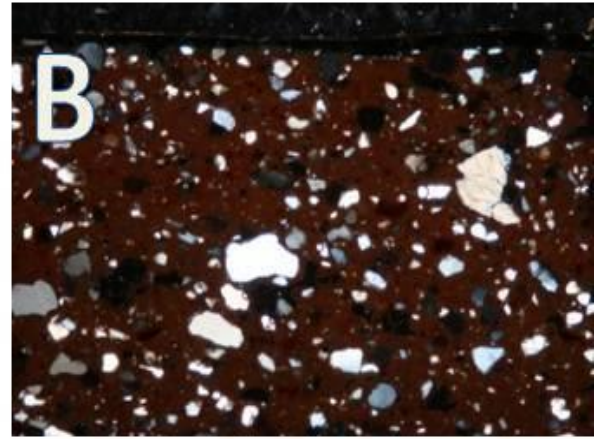
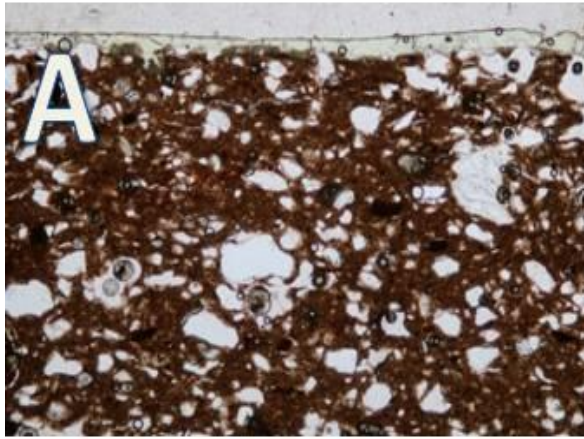


Photo micrographs showing the texture and non-plastic inclusions in sample UQ210. a: different sub-rounded quartz clasts in a homogeneous matrix by (PPL) mode, image width 2mm. b: same image showing rock clast and quartz by (CPL) mode, image width 4mm. c: inclusions orientation and the glaze layer by (PPL) mode, image width 2mm. d: same image by (CPL) mode, image width 2mm. e: hazy matrix indicates high firing temperatures by (PPL) mode, image width 0.5mm. f: same image by (CPL) mode, image width 0.5mm.

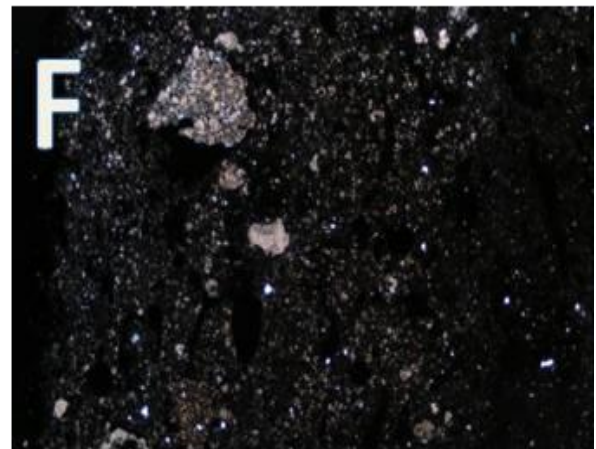
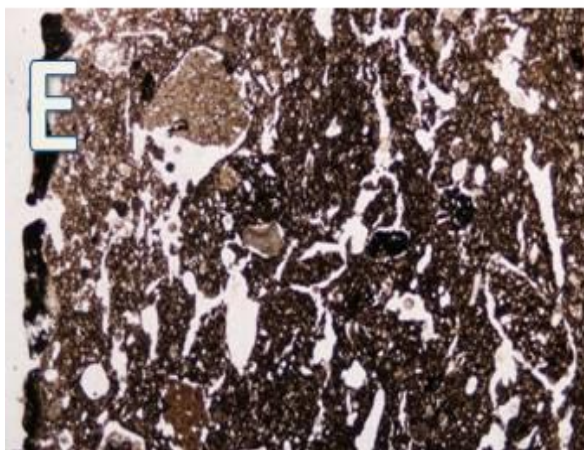
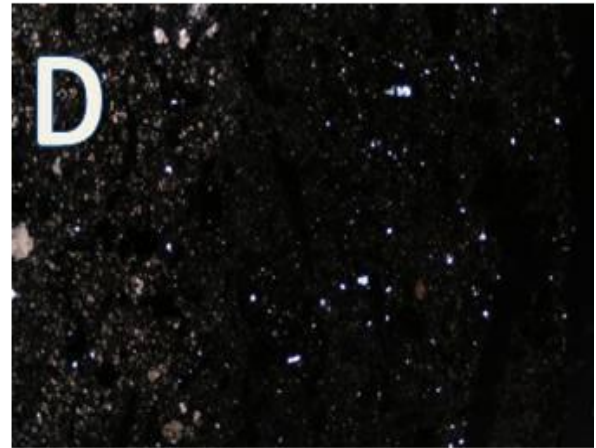
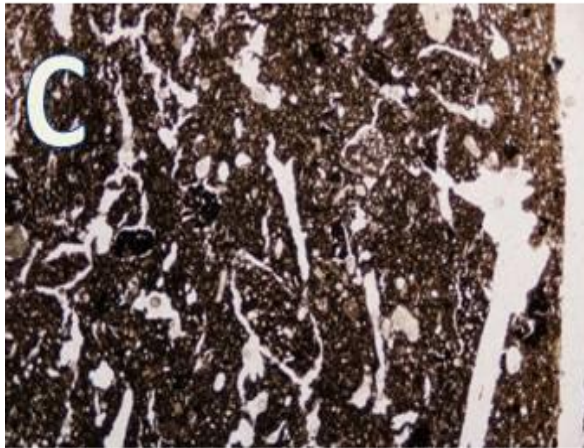
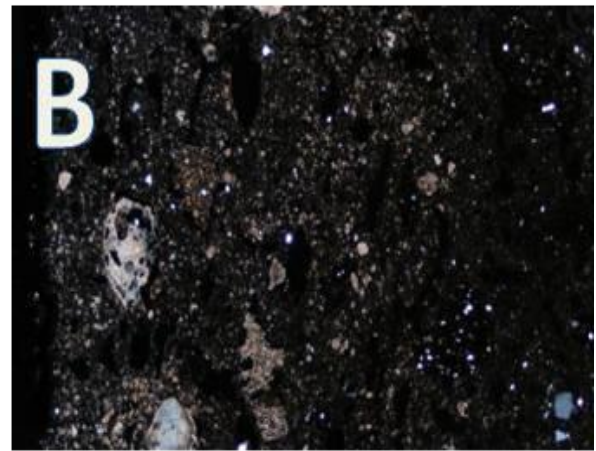
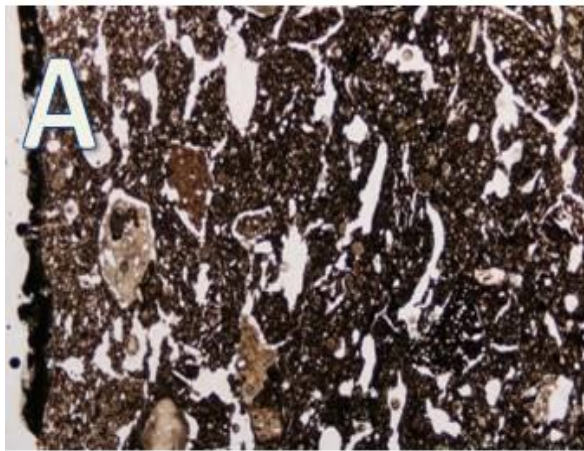


Photo micrographs showing the texture and non-plastic inclusions in sample UQ274. a: highly pores matrix contain very fine quartz clasts and coarse calcite clast by (PPL) mode, image width 4mm. b: same image by (CPL) mode, image width 4mm. C: another view by (PPL) mode, image width 2mm D: same image by (CPL) mode, image width 2mm. E: sandstone clast with the high porosity by (PPL) mode, image width 4mm. F: same image by (CPL) mode, image width 4mm.

G.3: The most distinctive photomicrographs of some samples from Umm el-Jimal.

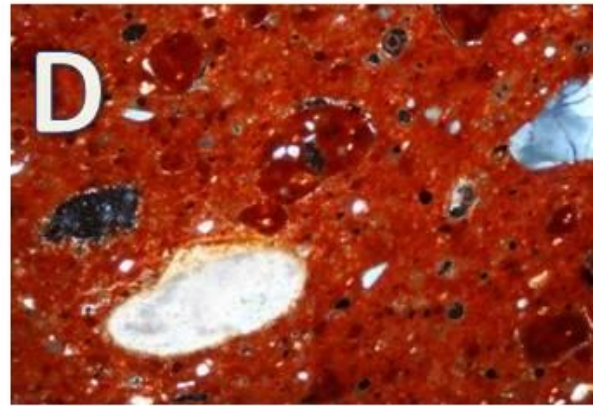
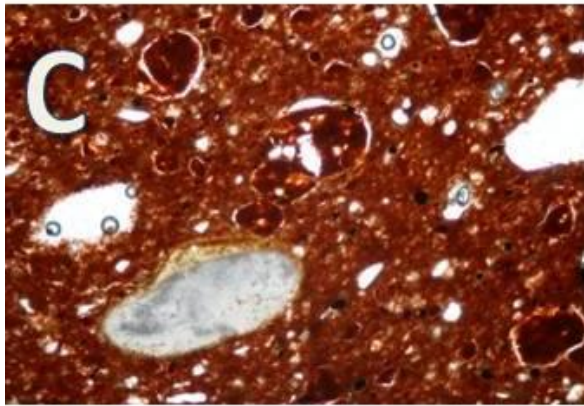
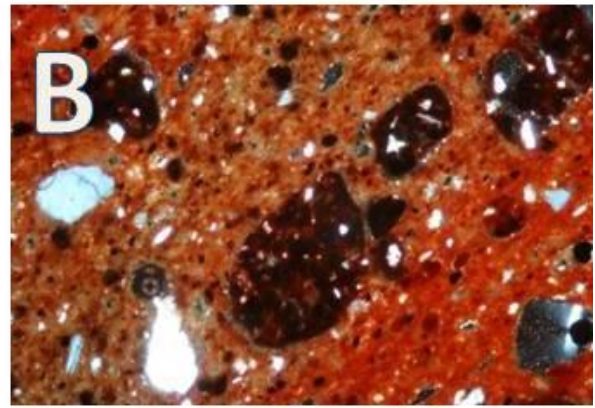
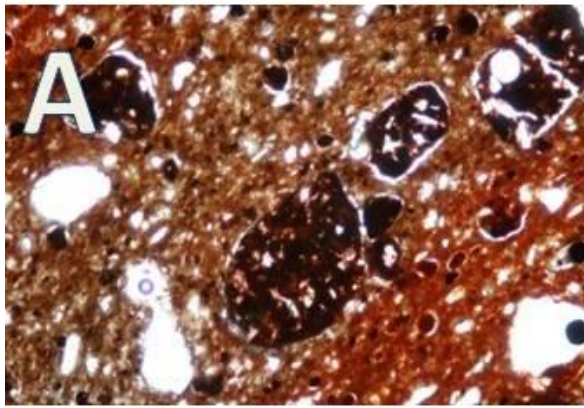


Photo micrographs showing the texture and non-plastic inclusions in sample UJ88. a: iron bearing matrix textured by rounded dark spots and rounded quartz clasts by (PPL) mode, image width 1mm. b: same image showing rock clast and quartz by (CPL) mode, , image width 1mm. C: homogeneous matrix with rounded reddish pellets by (PPL) mode, image width 1mm D: same image by (CPL) mode, image width 1mm.

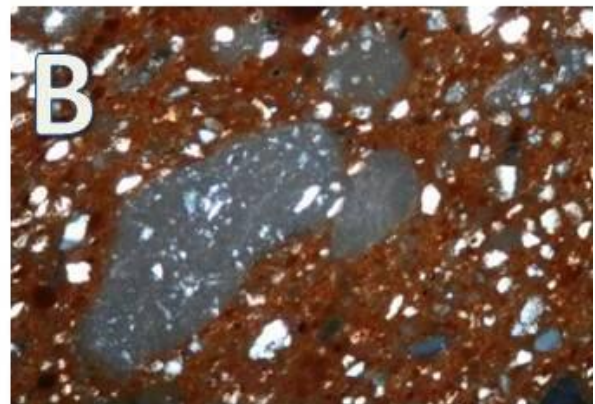
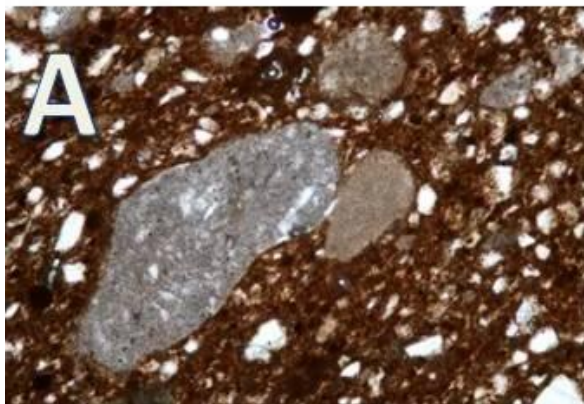


Photo micrographs showing the texture and non-plastic inclusions in sample UJ84. a: rounded reacted calcite (calcined) by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm.

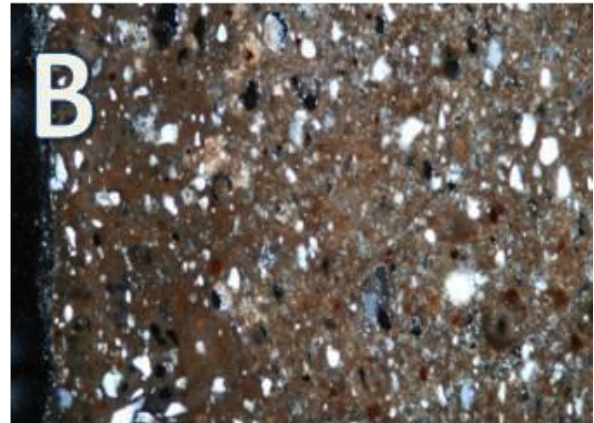
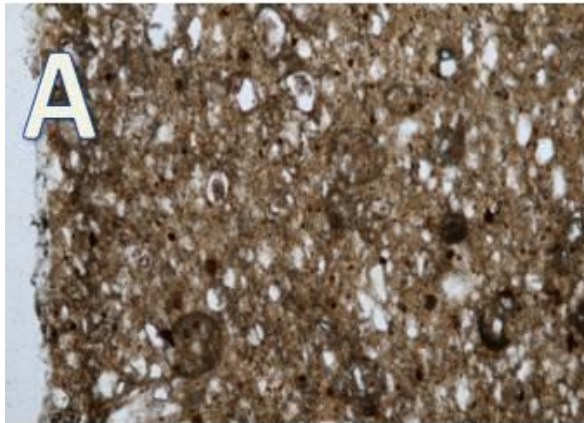


Photo micrographs showing the texture and non-plastic inclusions in sample UJ108. a: fine matrix with many quartz sub-rounded and sub-angular clasts by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

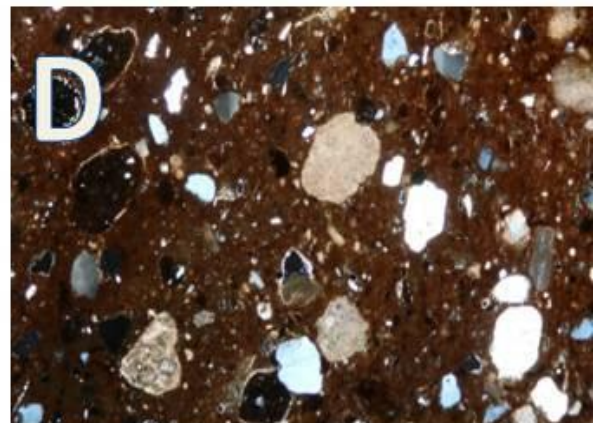
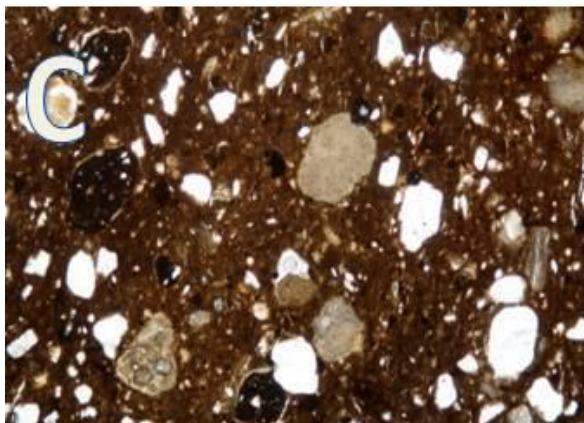
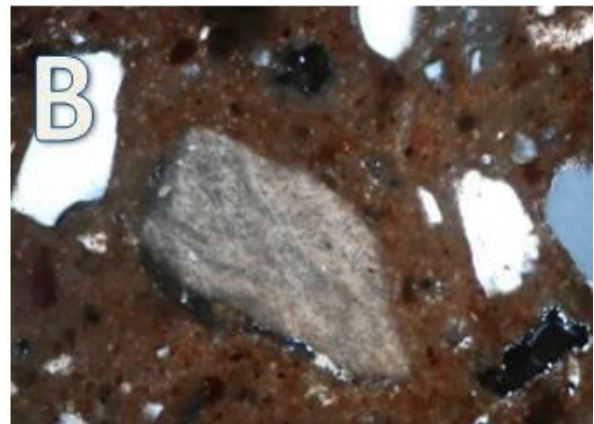
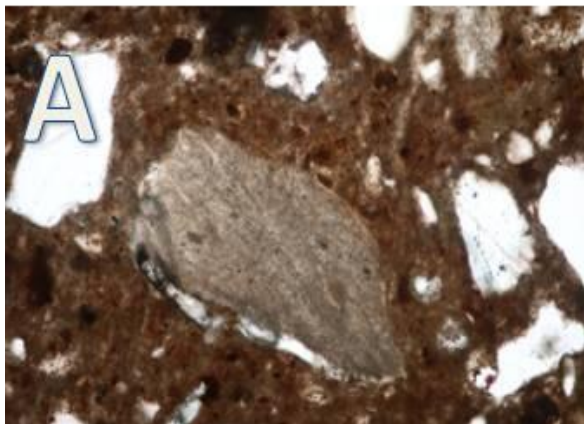


Photo micrographs showing the texture and non-plastic inclusions in sample UJ126. a: reacted calcite (calcedonite) with many sub-angular quartz clasts by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, image width 0.5mm. C: general view of the different inclusions distribution by (PPL) mode, image width 2mm D: same image by (CPL) mode, image width 2mm.

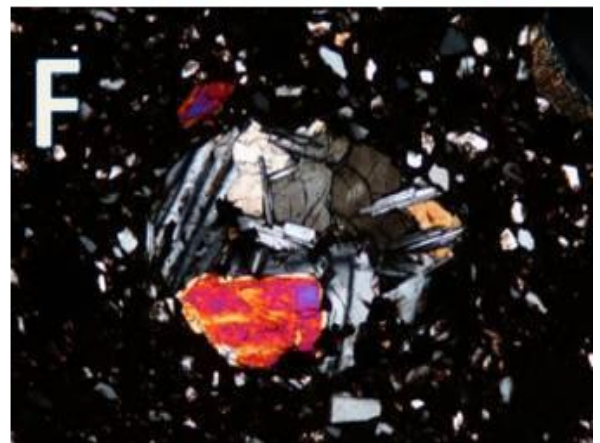
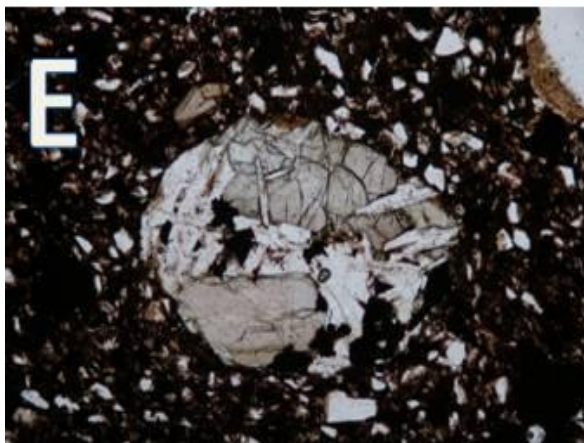
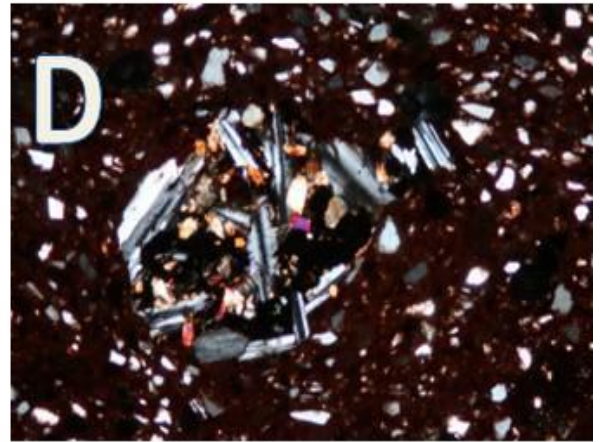
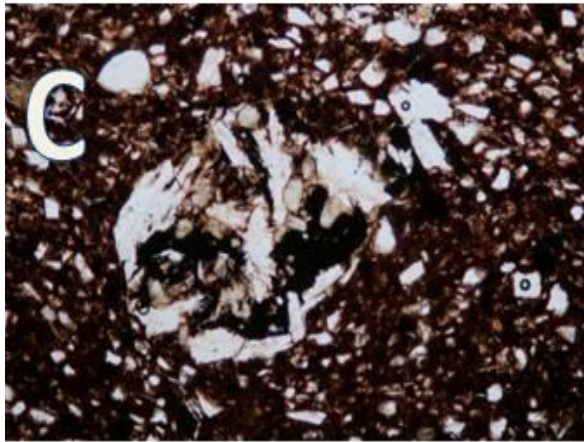
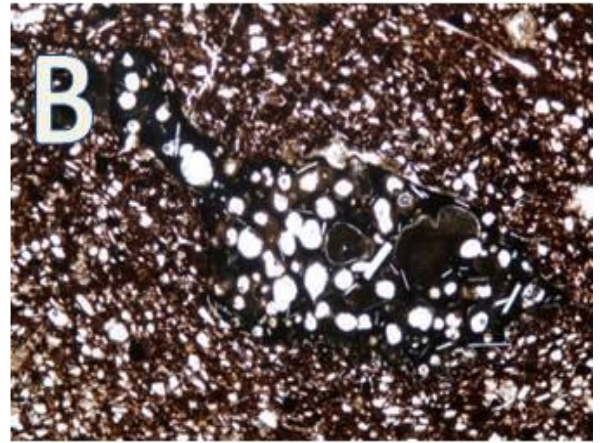
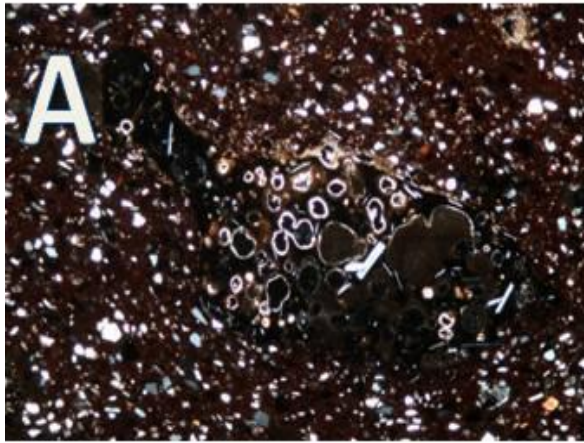


Photo micrographs showing the texture and non-plastic inclusions in sample UJ151. a: a lot of basaltic clasts containing mixture of plagioclase and clino-pyroxen by (PPL) mode, image width 2mm. b: same image by (CPL) mode, image width 2mm. C: basalt fragment by (PPL) mode, image width 1mm D: same image by (CPL) mode, image width 1mm. E: another basaltic fragment by (PPL) mode, image width 1mm. F: same image by (CPL) mode, image width 1mm.

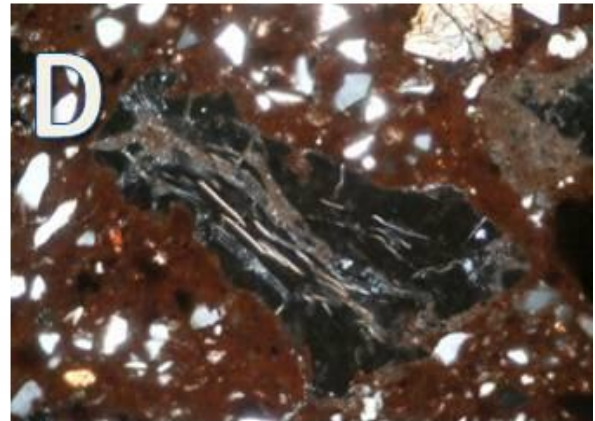
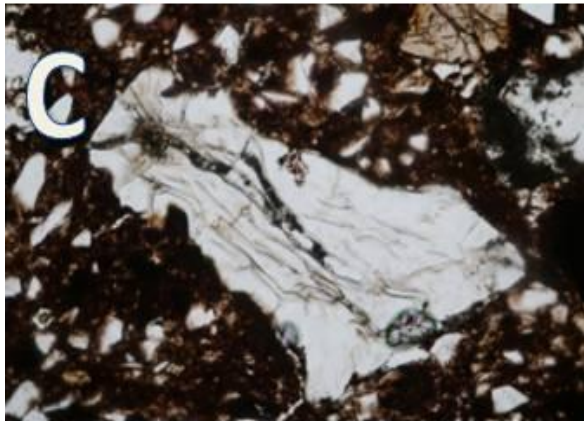
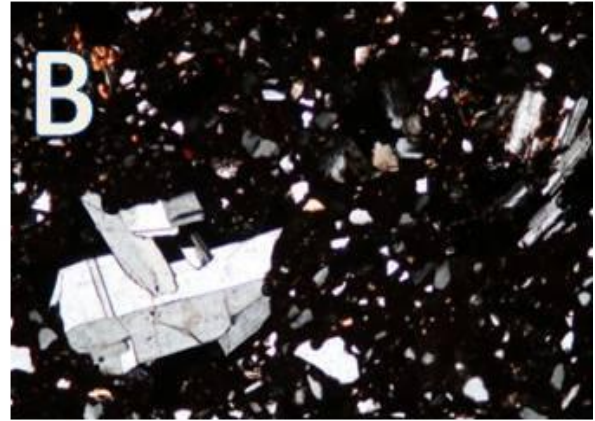
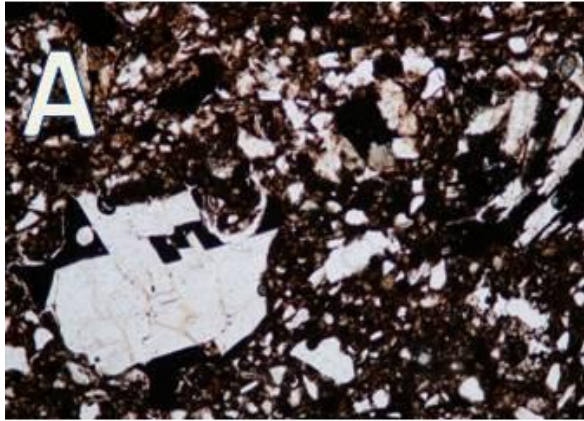


Photo micrographs showing the texture and non-plastic inclusions in sample UJ151. a: basaltic clasts by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm. C: many quartz clasts surrounding a deformed rock clast by (PPL) mode, image width 0.5mm D: same image by (CPL) mode, image width 0.5mm.

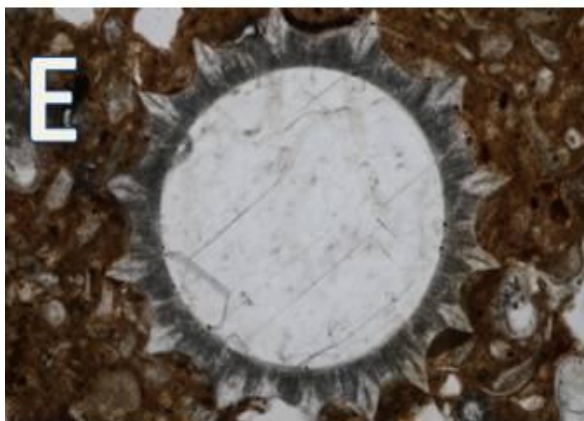


Photo micrographs showing the texture and non-plastic inclusions in sample UJ257. E: beautiful intact microfossil sun like shape by (PPL) mode, image width 0.5mm. F: same image by (CPL) mode, image width 0.5mm.

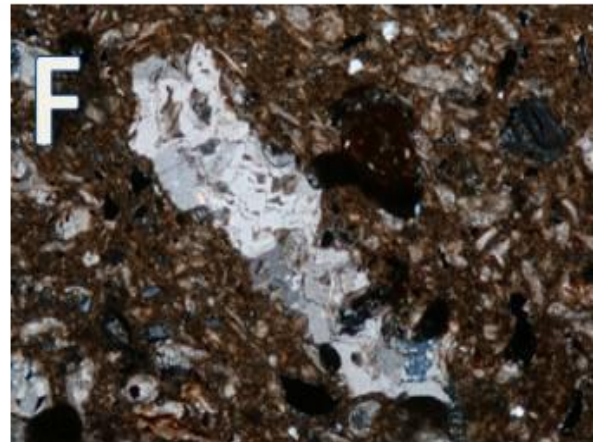
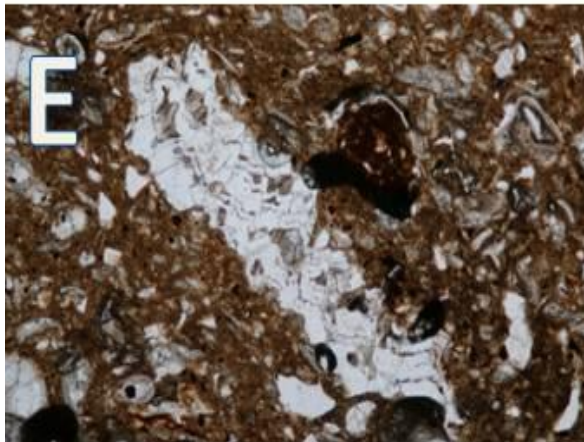
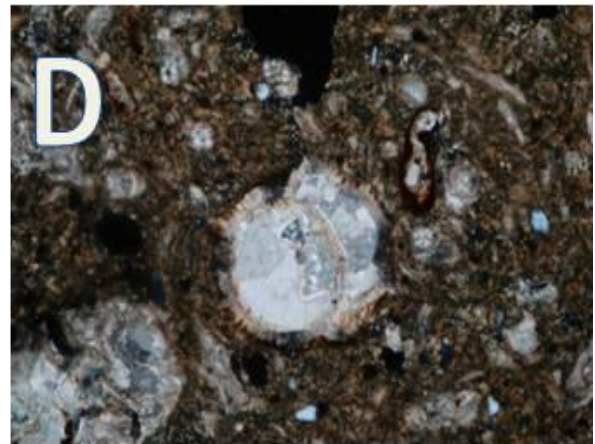
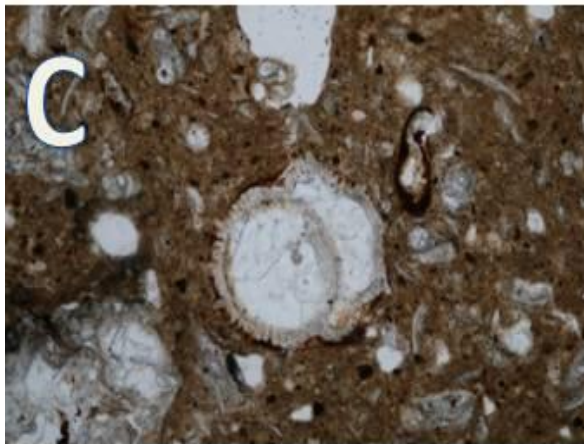
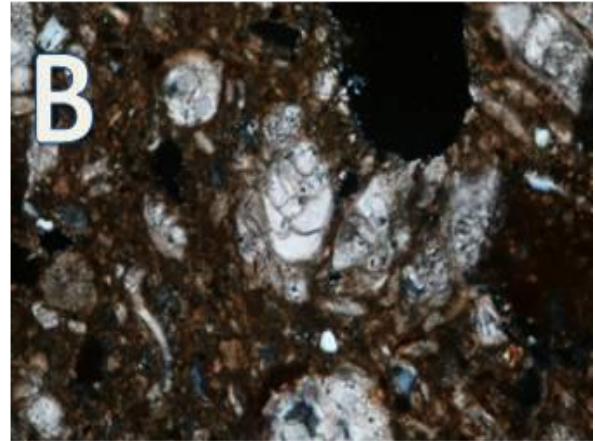
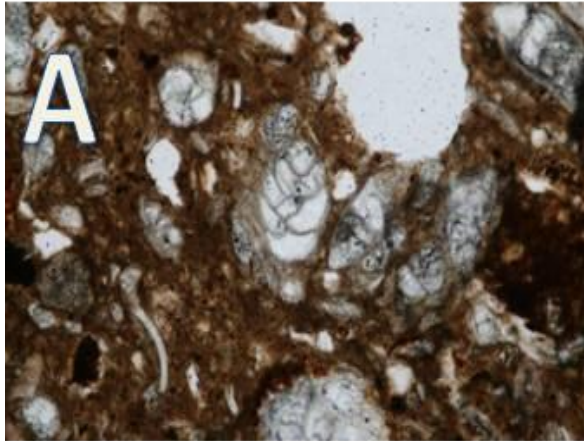


Photo micrographs showing the texture and non-plastic inclusions in sample UJ257. a: plenty of foraminifera fossil undisturbed by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, image width 0.5mm. C: undisturbed foraminifera microfossil calcite clasts indicating the origin of the clayey materials by (PPL) mode, image width 0.5mm. D: same image by (CPL) mode, image width 0.5mm. E: different types of microfossil by (PPL) mode, image width 1mm F: same image by (CPL) mode, image width 1mm.

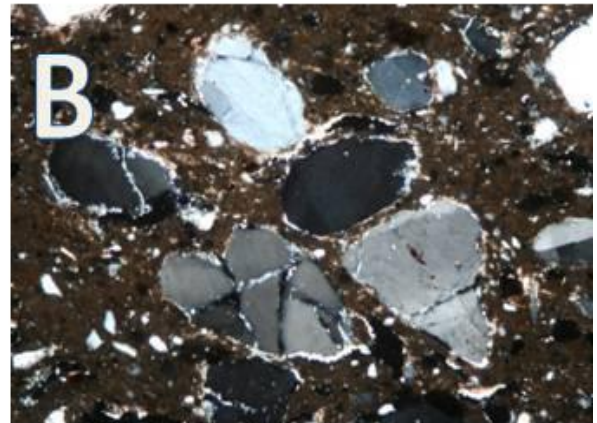
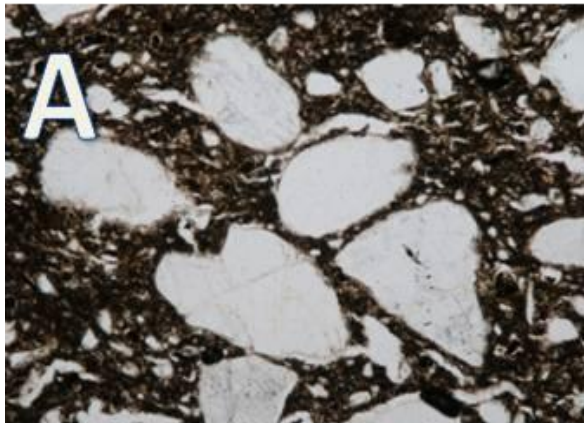


Photo micrographs showing the texture and non-plastic inclusions in sample UJ306. a: plenty of sub rounded quartz clasts its edges are surrounded secondary calcite by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

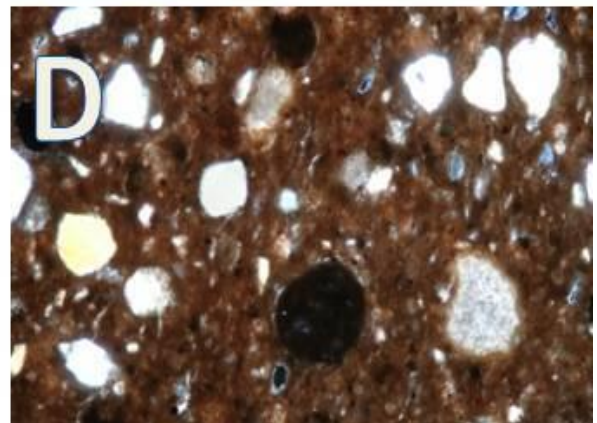
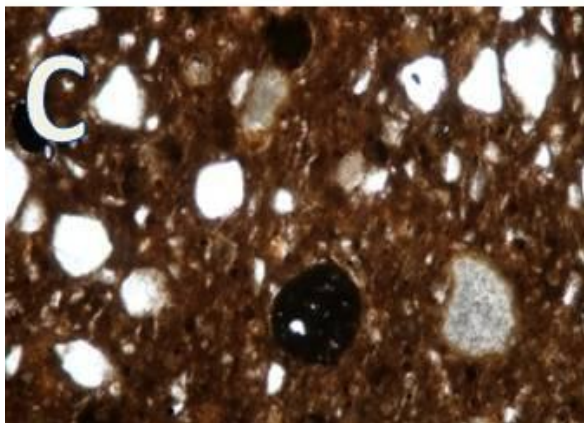
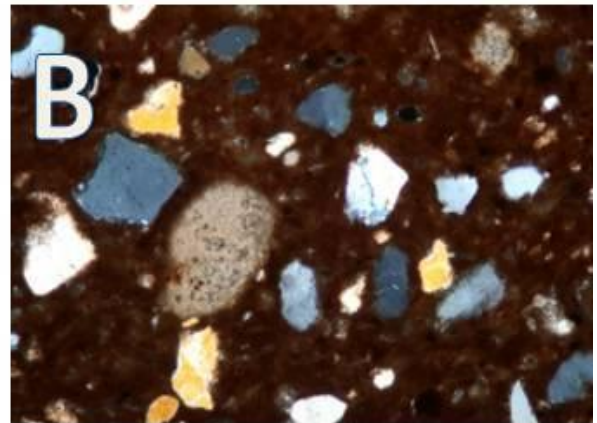
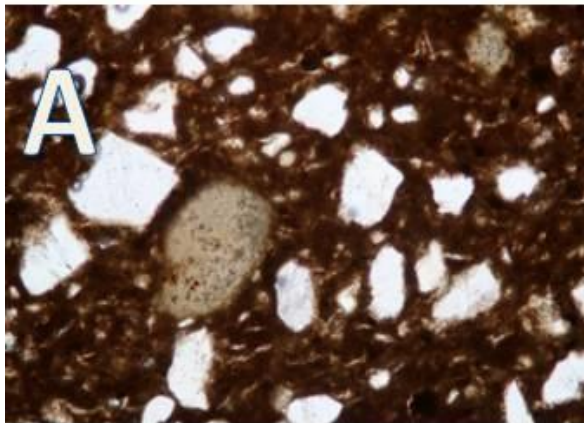


Photo micrographs showing the texture and non-plastic inclusions in sample UJ340. a: highly sintered matrix contain sub-rounded coarse quartz clasts by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm. C: calcined limestone and rounded black spots by (PPL) mode, image width 1mm. D: same image by (CPL) mode, image width 1mm.

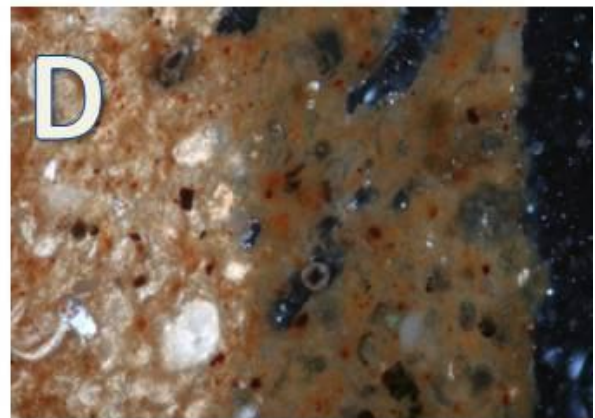
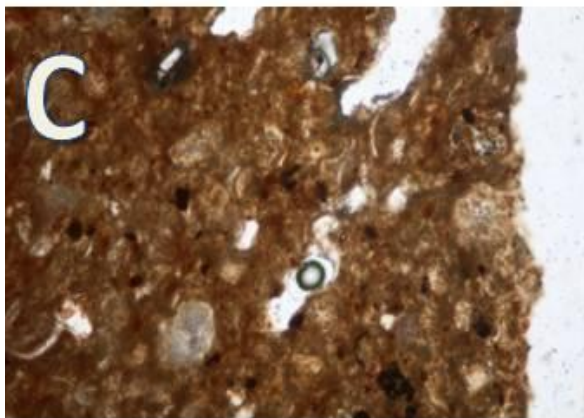
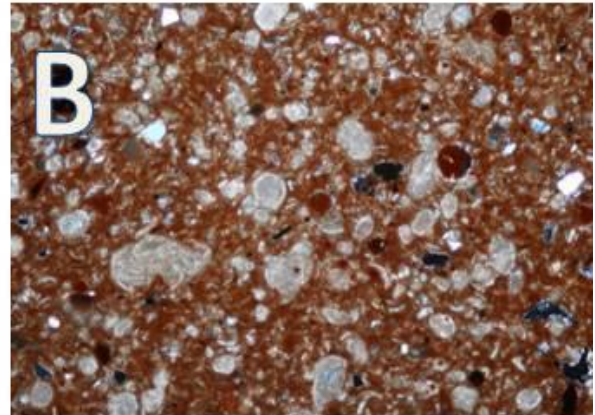
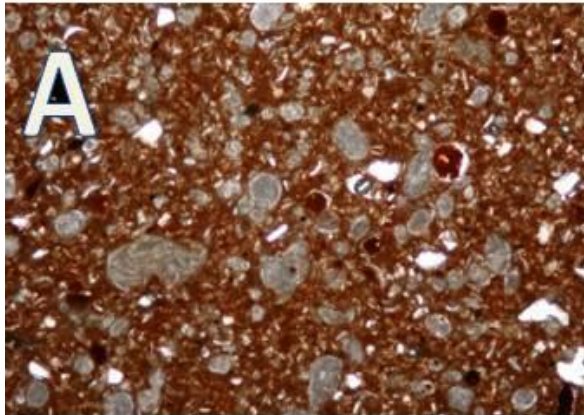


Photo micrographs showing the texture and non-plastic inclusions in sample UJ343. a: iron bearing matrix textured by plenty of microfossils rounded clasts undisturbed by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm. C: matrix texture with rounded reddish pellets by (PPL) mode, image width 0.5mm D: same image by (CPL) mode, image width 0.5mm.

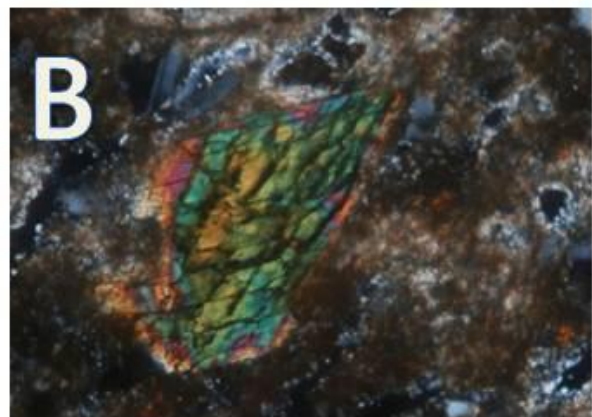
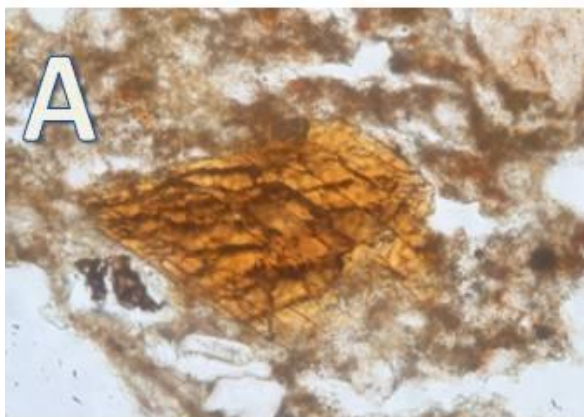


Photo micrographs showing the texture and non-plastic inclusions in sample UJ560. a: mussel shell clast indicating the origin of the clayey materials by (PPL) mode, image width 0.2mm. b: same image by (CPL) mode, , image width 0.2mm.

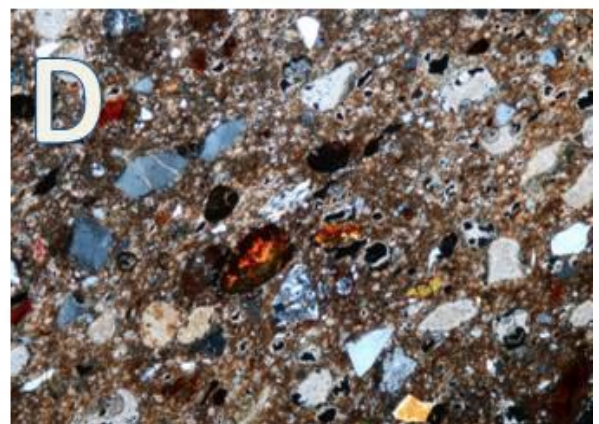
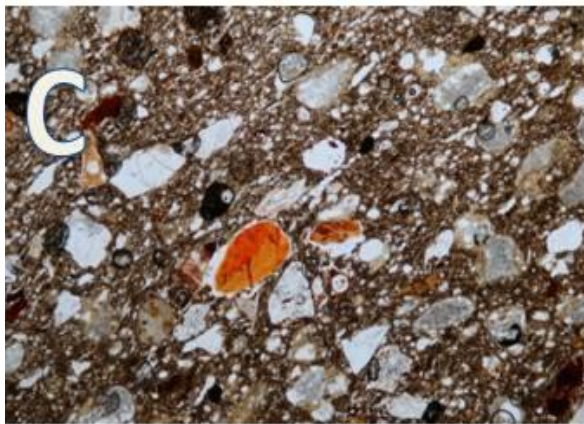
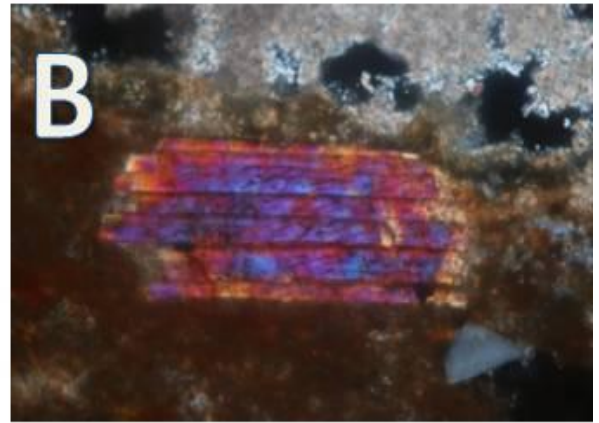
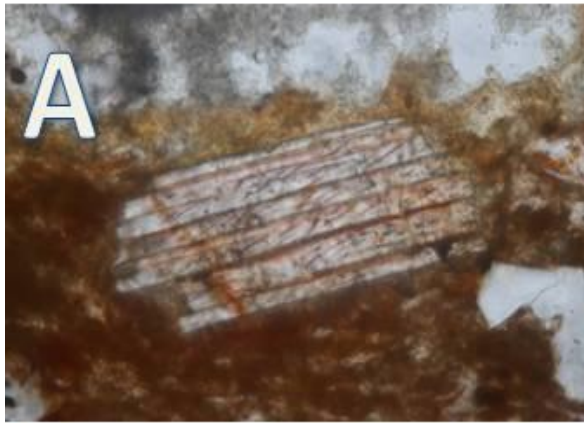


Photo micrographs showing the texture and non-plastic inclusions in sample UJ560. C: clear shell twinning by (PPL) mode, image width 0.2mm D: same image by (CPL) mode, image width 0.2mm. E: different quartz sub-angular clasts and many reacted microfossils by (PPL) mode, image width 2mm. F: same image by (CPL) mode, image width 2mm.

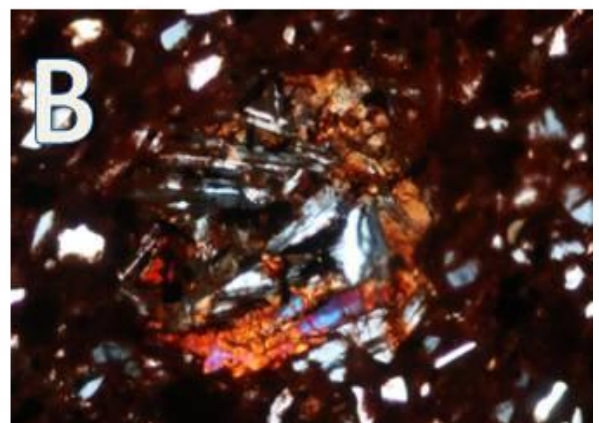
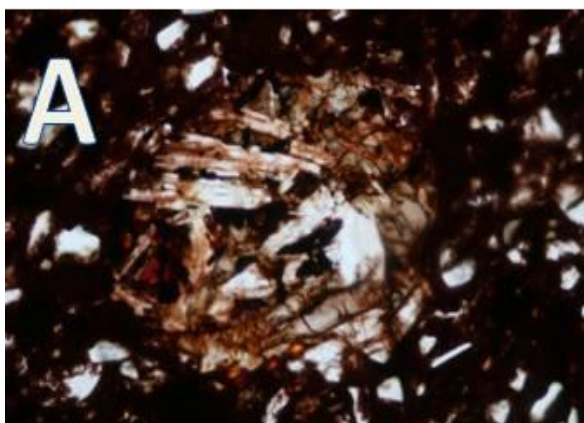


Photo micrographs showing the texture and non-plastic inclusions in sample UJ617. a: basaltic clast (plagioclase + clinopyroxen) by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, image width 0.5mm.

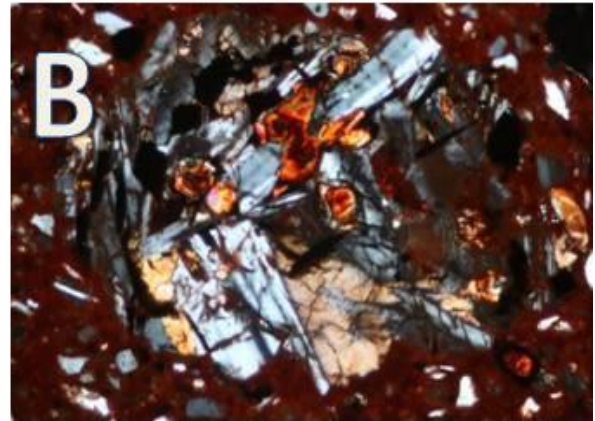
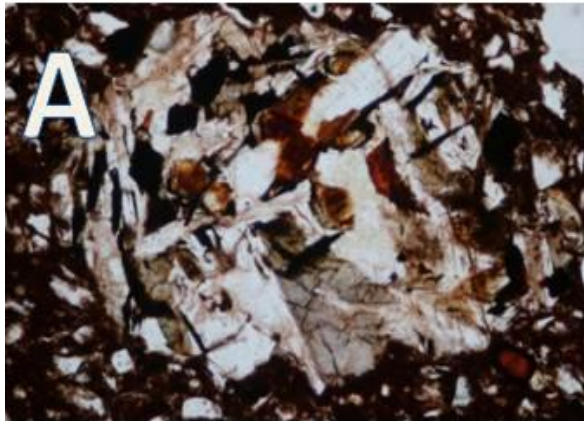


Photo micrographs showing the texture and non-plastic inclusions in sample UJ617. a: basaltic clast (plagioclase + clinopyroxen) by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, , image width 0.5mm.

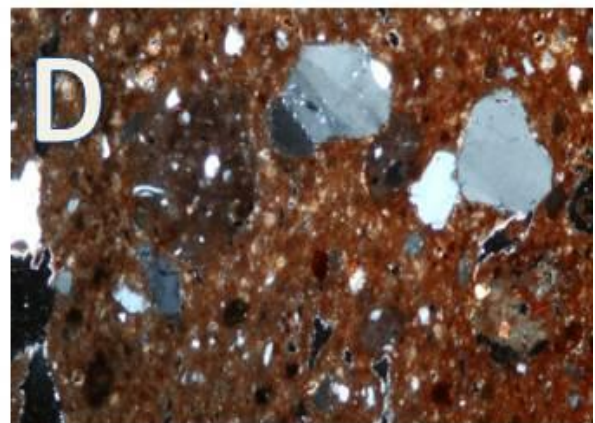
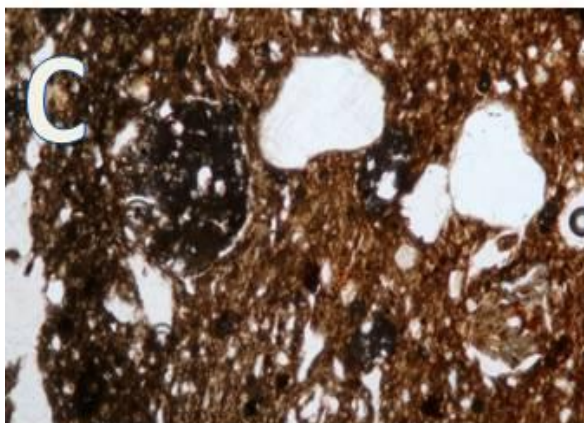
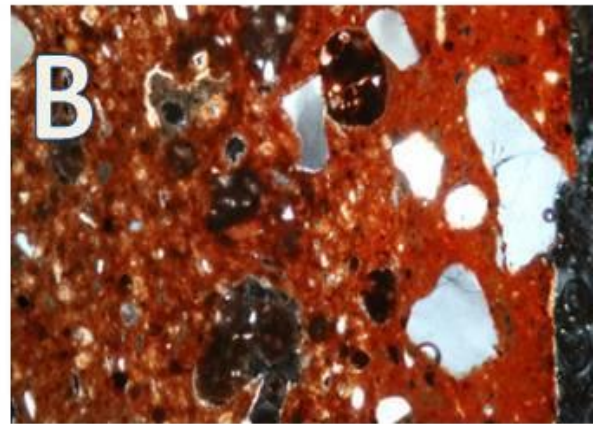
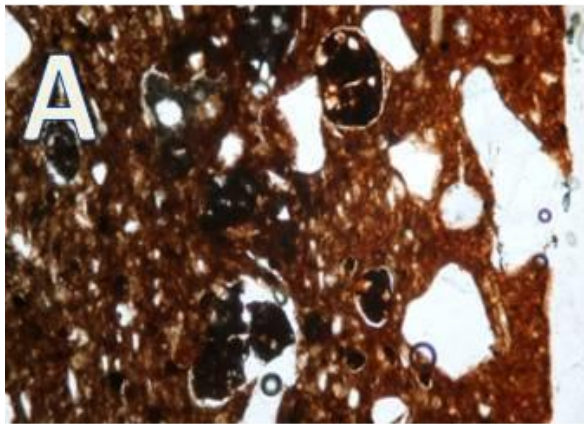


Photo micrographs showing the texture and non-plastic inclusions in sample UJ622. a: different quartz clasts and rounded dark spots by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm. C: different quartz clasts and rounded dark spots possibly grog by (PPL) mode, image width 1mm. D: same image by (CPL) mode, , image width 1mm.

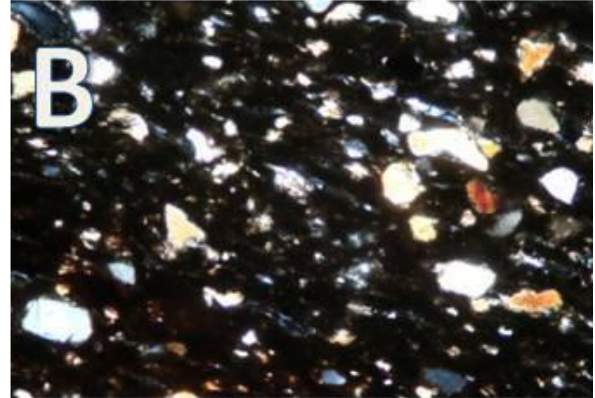
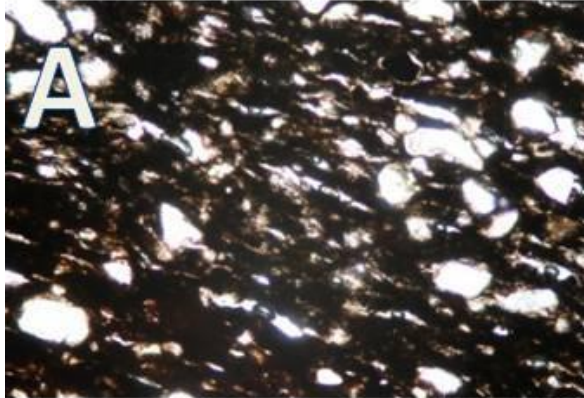


Photo micrographs showing the texture and non-plastic inclusions in sample UJ639. a: oriented porosity and inclusions clasts in the direction of fabrication by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

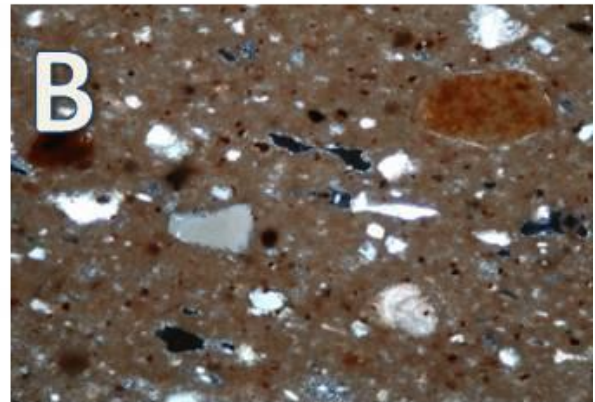
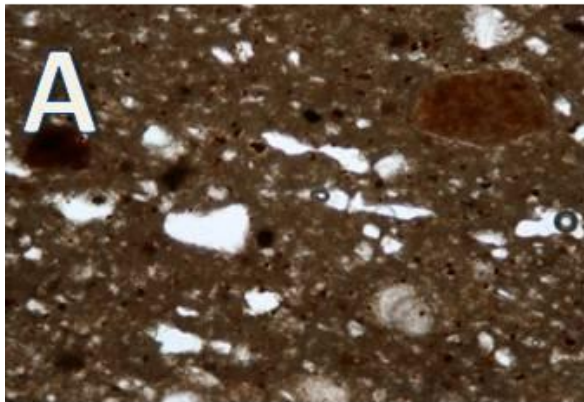


Photo micrographs showing the texture and non-plastic inclusions in sample UJ648. a: fine matrix with some fine rounded reacted microfossils by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

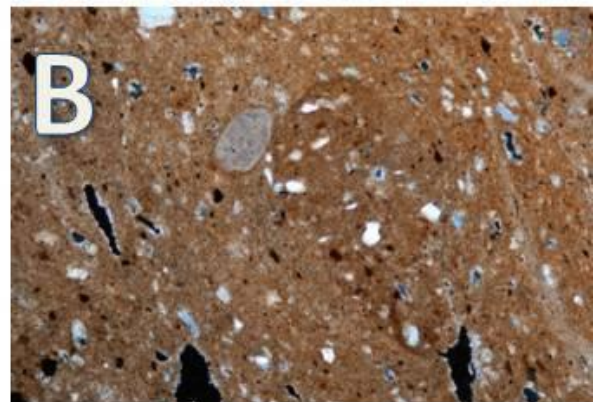
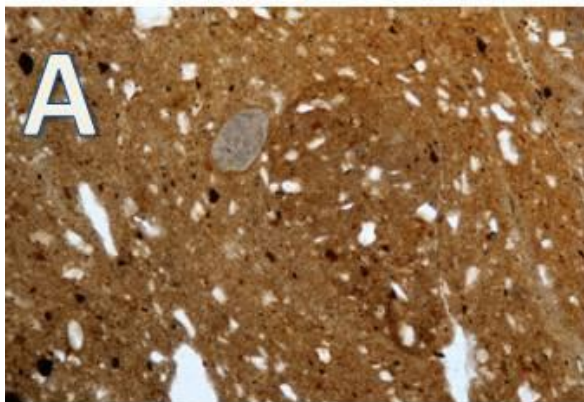


Photo micrographs showing the texture and non-plastic inclusions in sample UJ649. a: fine matrix with some fine rounded quartz, reacted calcite clasts and secondary calcite around pores by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

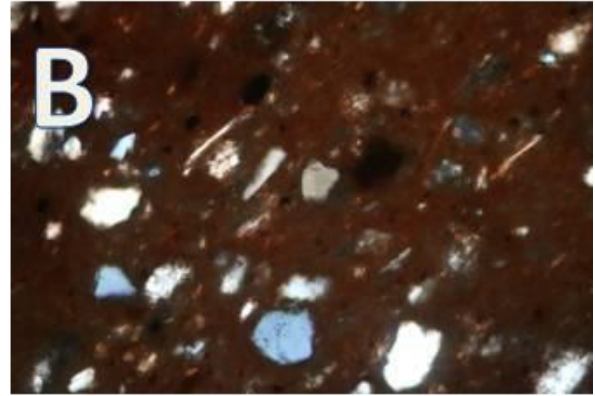
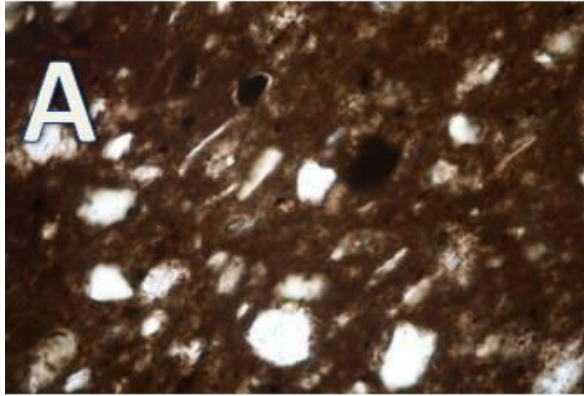


Photo micrographs showing the texture and non-plastic inclusions in sample UJ692. a: oriented mica flakes and sub-rounded quartz clasts by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, , image width 0.5mm.

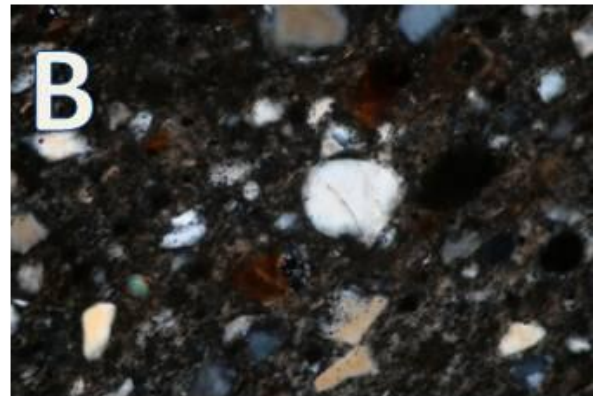
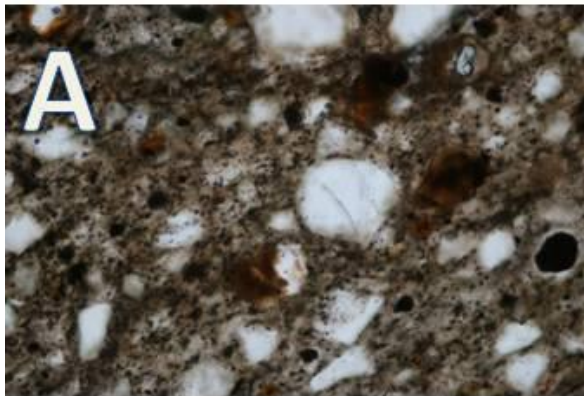


Photo micrographs showing the texture and non-plastic inclusions in sample UJ705. a: highly fired matrix with some rounded quartz by (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, , image width 0.5mm.

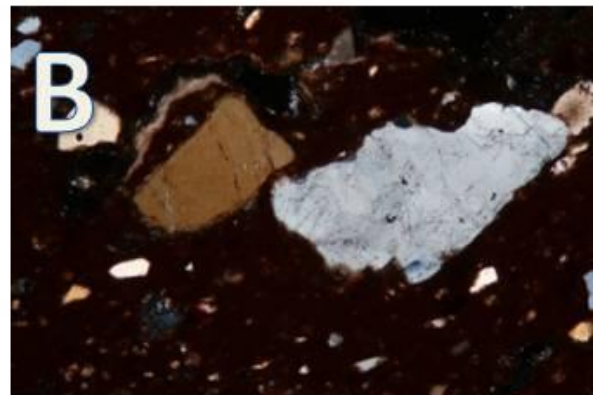
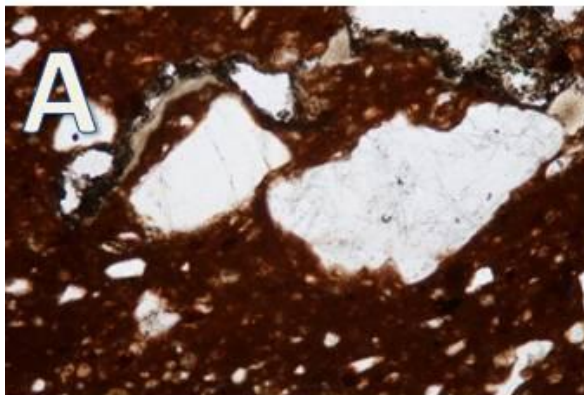


Photo micrographs showing the texture and non-plastic inclusions in sample UJ711. a: fine and coarse quartz clasts obtained rounded edges by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm.

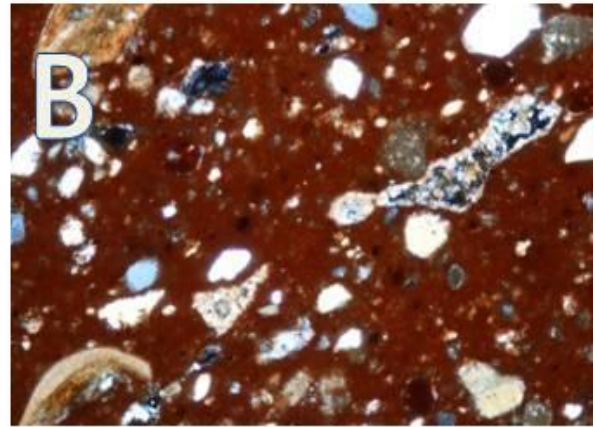
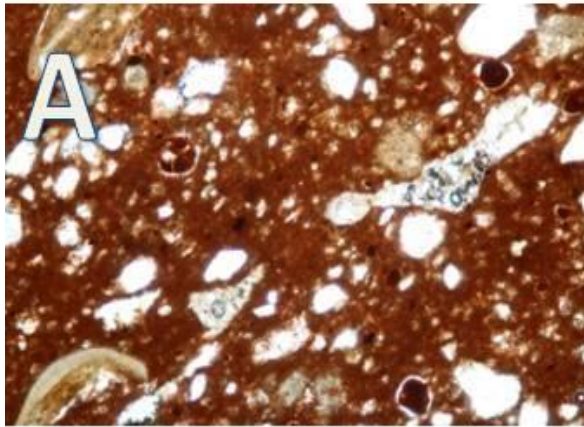


Photo micrographs showing the texture and non-plastic inclusions in sample UJ711. a: secondary calcite filling pores by (PPL) mode, image width 1mm b: same image by (CPL) mode, image width 1mm.

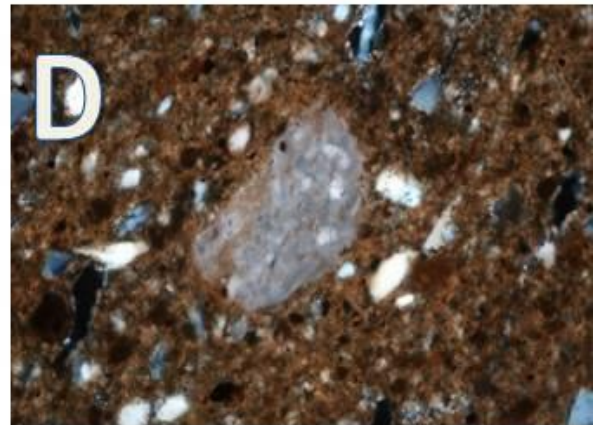
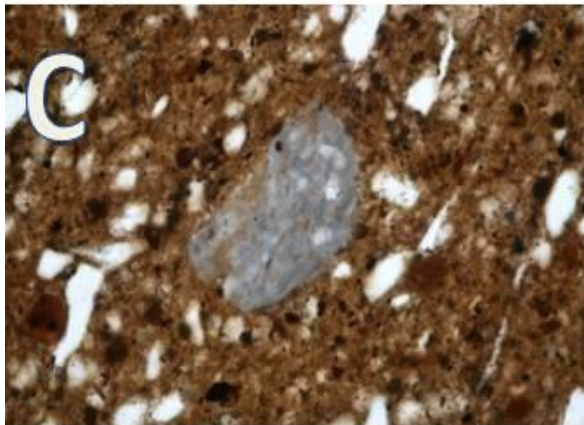
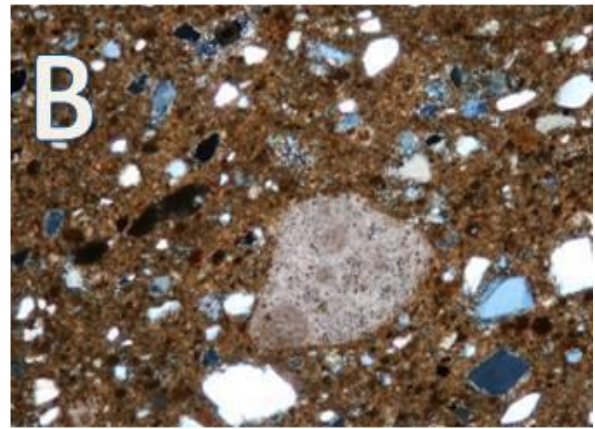
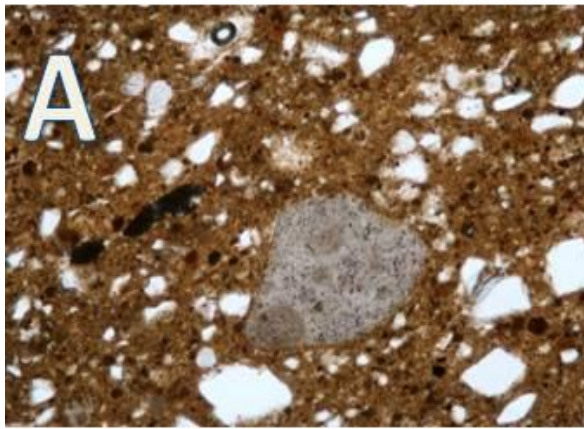


Photo micrographs showing the texture and non-plastic inclusions in sample UJ863. a: coarse calcite clast went through calcinations process with quartz medium size inclusions by (PPL) mode, image width 1mm b: same image by (CPL) mode, image width 1mm. C: another calcite clast by (PPL) mode, image width 0.5mm. D: same image by (CPL) mode, image width 0.5mm.

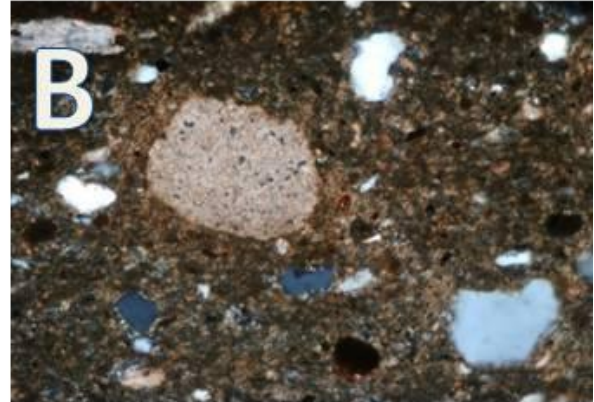
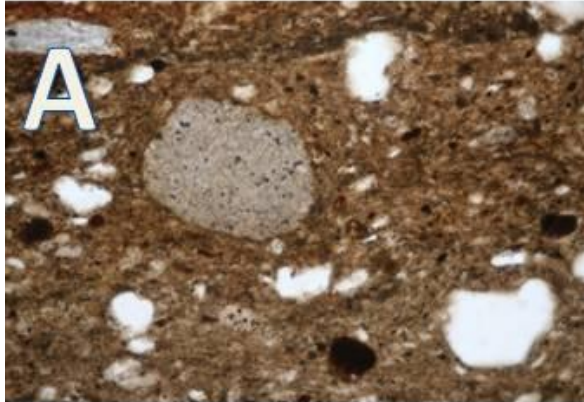


Photo micrographs showing the texture and non-plastic inclusions in sample UJ888. a: reacted calcite clast (PPL) mode, image width 0.5mm. b: same image by (CPL) mode, , image width 0.5mm.

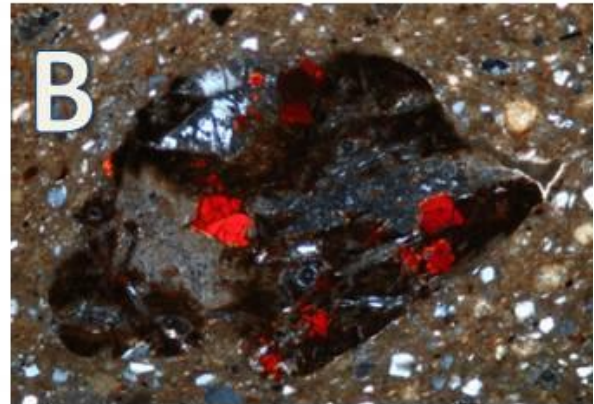
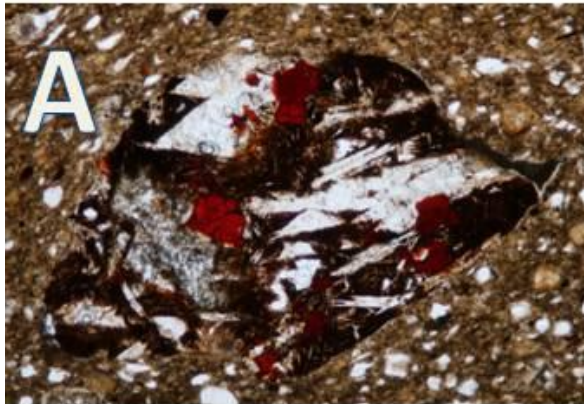


Photo micrographs showing the texture and non-plastic inclusions in sample UJ895. a: basaltic clast by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm.

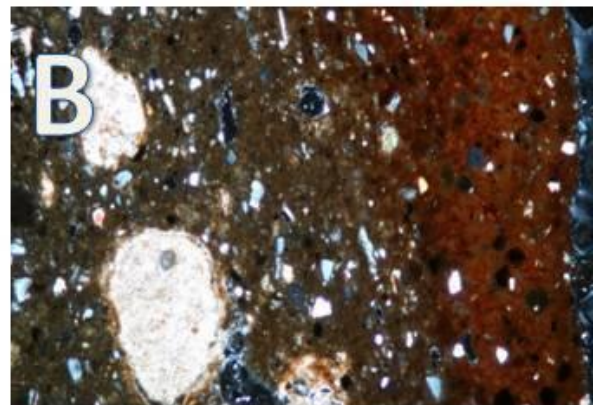
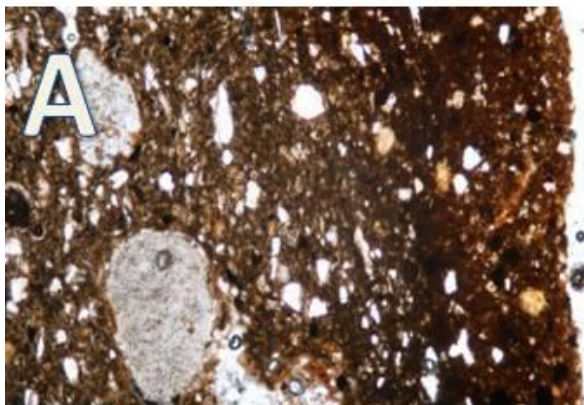


Photo micrographs showing the texture and non-plastic inclusions in sample UJ895. a: over reacted rounded calcite clast by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm.

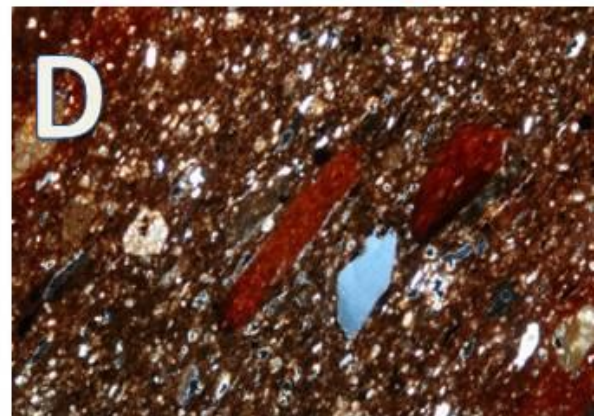
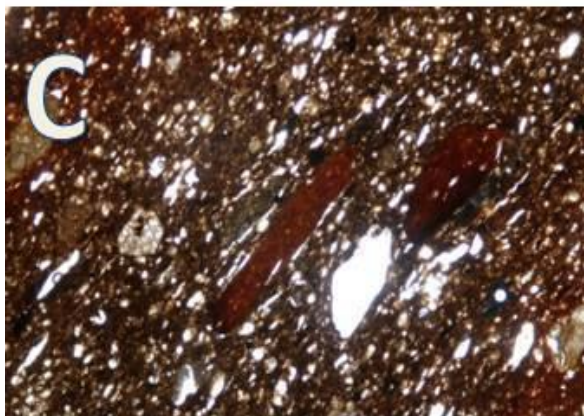
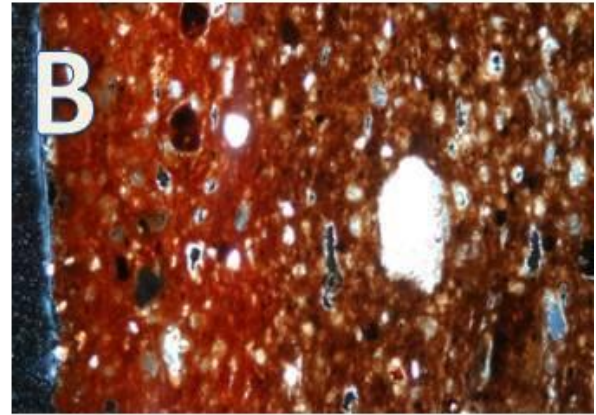
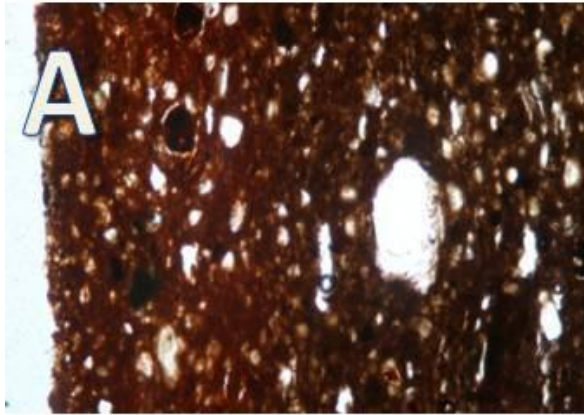


Photo micrographs showing the texture and non-plastic inclusions in sample UJ912. a: fine and coarse quartz clasts obtained rounded edges besides the glaze layer by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm. C: oriented inclusions in forming direction by (PPL) mode, image width 2mm D: same image by (CPL) mode, image width 2mm.

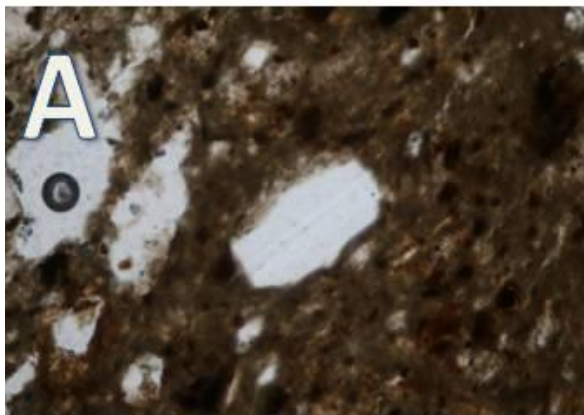


Photo micrographs showing the texture and non-plastic inclusions in sample UJ917. a: sintered matrix with one plagioclase clast by (PPL) mode, image width 0.5mm. b: same image showing clear plagioclase twinning by (CPL) mode, image width 0.5mm.

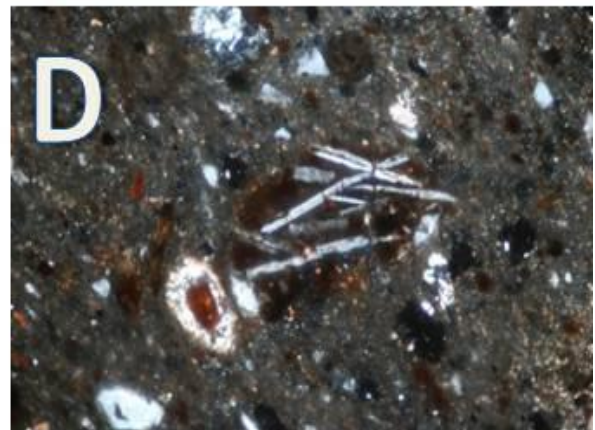
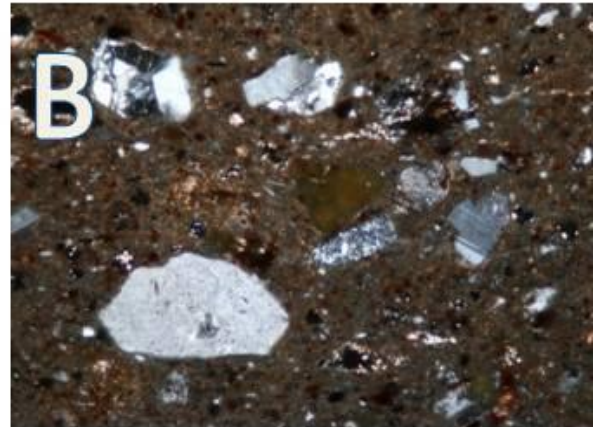
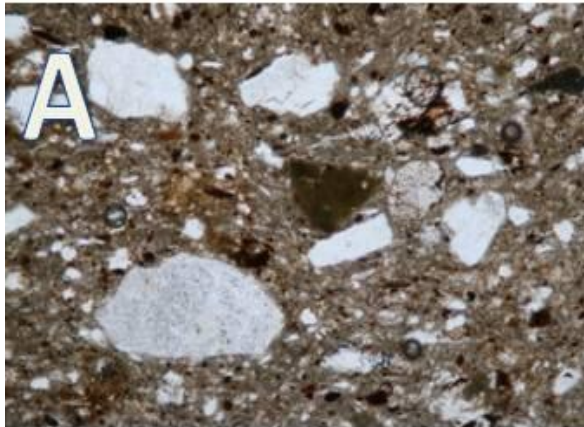


Photo micrographs showing the texture and non-plastic inclusions in sample UJ917_ a: rock clast, quartz clast, plagioclase clast, sandstone clast, and basaltic clast by (PPL) mode, image width 1mm b: same image by (CPL) mode, image width 1mm. c: basaltic clast with clear plagioclase by (PPL) mode, image width 0.5mm. d: same image by (CPL) mode, image width 0.5mm.

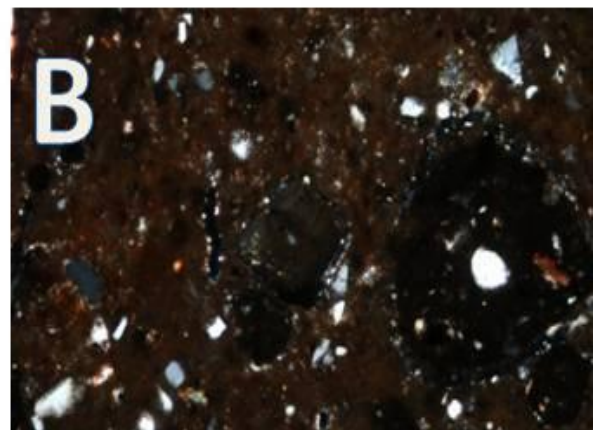
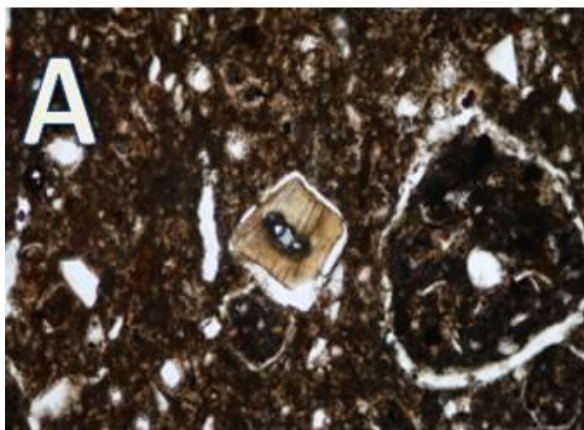


Photo micrographs showing the texture and non-plastic inclusions in sample UJ961. a: high firing resulted in contraction of some inclusions by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm.

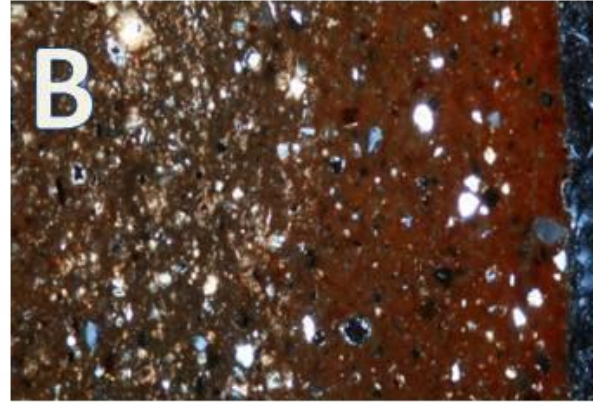
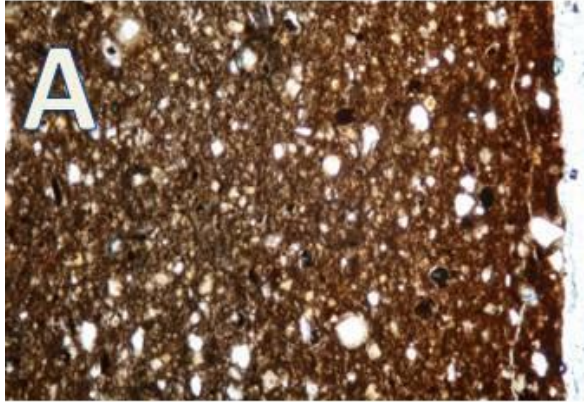


Photo micrographs showing the texture and non-plastic inclusions in sample UJ977. a: homogenous matrix with fine quartz clasts by (PPL) mode, image width 1mm. b: same image showing rodolite inclusions between exterior and interior of the body by (CPL) mode, , image width 1mm.

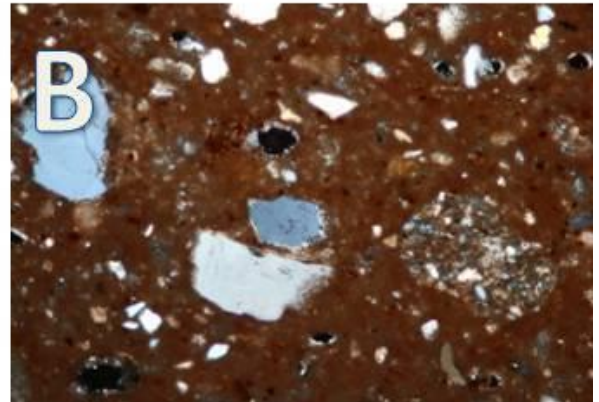
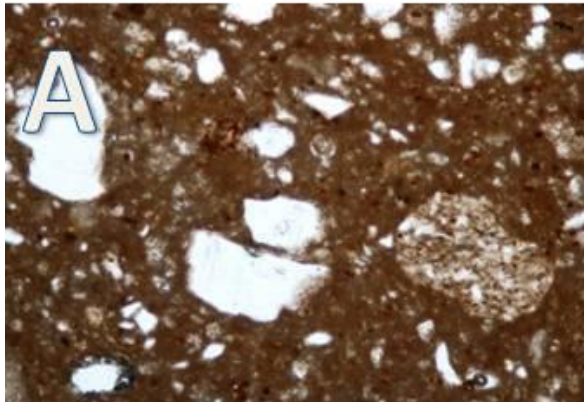


Photo micrographs showing the texture and non-plastic inclusions in sample UJ991. a: many coarse angular quartz clasts and one sandstone clast by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm

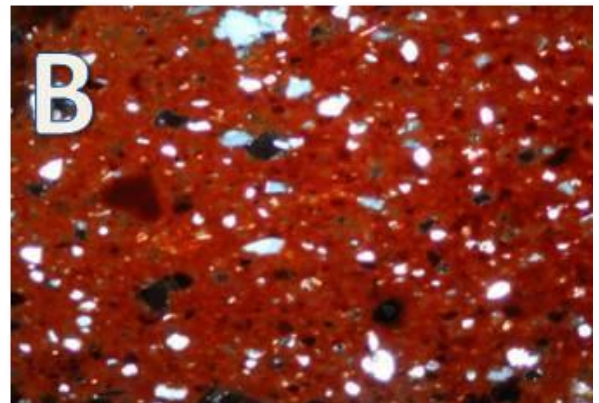
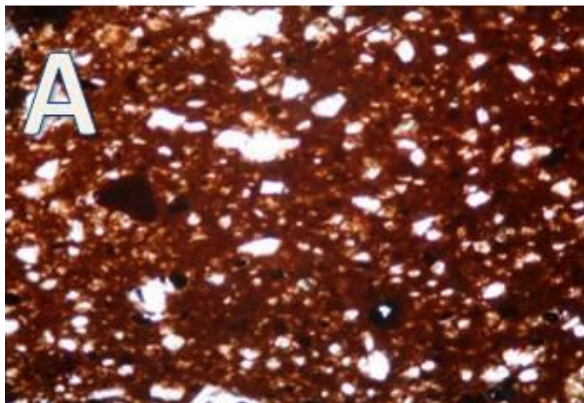


Photo micrographs showing the texture and non-plastic inclusions in sample UJ1001. a: homogenous highly fired matrix with fine quartz clasts by (PPL) mode, image width 1mm. b: same image by (CPL) mode, , image width 1mm.

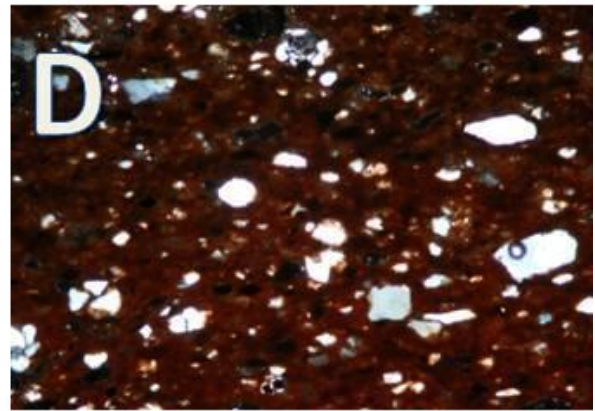
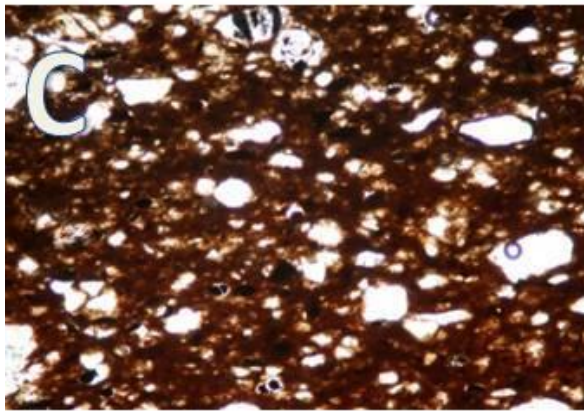
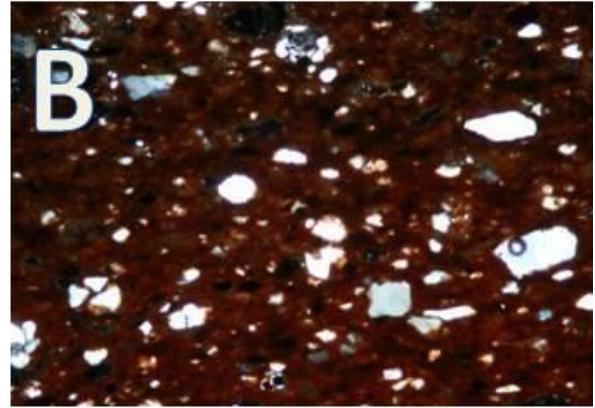
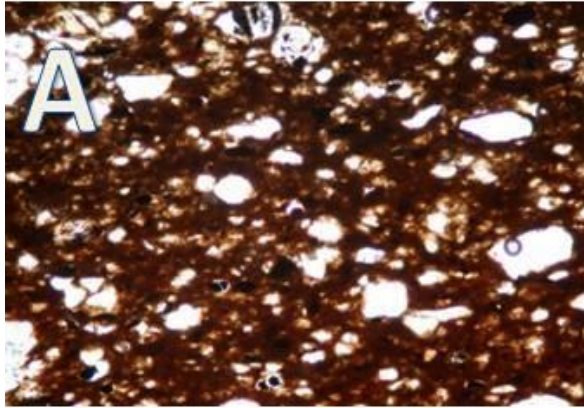


Photo micrographs showing the texture and non-plastic inclusions in sample UJ1111. a: homogenous highly fired matrix with fine quartz clasts by (PPL) mode, image width 1mm. b: same image by (CPL) mode, image width 1mm. C: homogenous highly fired matrix with many quartz clasts by (PPL) mode, image width 1mm. D: same image by (CPL) mode, image width 1mm.

H: The XRD qualitative and semi quantitative results of the three time periods.

H.1: the Early Islamic period

sample #	Qz	Cal	Kfs	Ms	Hem	Ap	An	Cpx	Geh	Spl	Mul	glass	Σ Xls	Σ weight %
E.I.sherds														
UJ649	9	44	4	6	0	0	5	0	0	0	0	32	68	100
UJ322	14	38	3	0	3	0	4	14	8	0	3	12	88	100
UJ920	20	36	0	0	0	0	14	21	2	0	0	7	93	100
UJ343	6	29	0	2	3	9	11	7	29	0	0	4	96	100
UQ163	6	29	0	0	0	12	12	8	29	0	0	4	96	100
UJ1203	16	22	0	5	0	0	16	15	4	0	0	9	91	100
UJ671	6	22	0	0	2	7	18	0	21	0	0	14	86	100
UJ562	5	21	0	0	0	14	19	0	27	0	0	3	97	100
UQ20	7	19	0	0	0	9	11	10	11	0	0	33	67	100
UJ1023	32	19	3	7	0	0	24	0	0	0	3	13	87	100
UJ1110	14	18	0	0	0	4	4	29	26	0	0	4	96	100
UJ848	33	18	4	9	0	0	11	0	0	0	6	7	93	100
UJ776	12	14	0	0	2	12	25	8	13	0	2	3	97	100
UJ891	12	13	0	0	0	0	16	33	3	0	2	19	81	100
UJ326	5	13	0	0	0	8	8	0	45	0	0	15	85	100
UJ916	17	11	0	0	3	0	19	13	19	0	2	16	84	100
UJ846	24	10	0	0	2	0	20	3	10	3	2	10	90	100
AB104	10	9	0	0	5	5	35	5	21	0	0	12	88	100
UJ863	32	9	3	7	0	0	5	0	0	0	0	44	56	100
UJ648	34	9	0	2	1	0	25	0	25	0	0	5	95	100
AB126	10	8	0	0	5	5	28	4	26	0	0	14	86	100
UJ917	11	8	0	0	1	0	15	43	11	0	2	9	91	100
UJ1093	27	8	0	0	1	0	16	9	10	0	0	26	74	100
UJ641	19	8	0	0	3	0	29	3	18	3	0	13	87	100
UJ895	13	8	0	2	2	0	24	17	11	0	0	23	77	100
UJ95	26	6	0	0	0	0	18	0	15	0	0	19	81	100
UJ711	27	6	0	3	0	0	18	4	11	0	0	30	70	100
UJ340	40	6	0	0	0	0	24	4	14	0	0	11	89	100
UJ231	40	6	0	9	0	0	6	0	0	0	3	36	64	100
AB272	25	6	0	5	5	0	4	0	0	0	0	52	49	100
UJ647	26	5	0	4	5	0	6	0	6	0	0	47	53	100
AB90	9	5	0	0	3	0	42	6	21	0	0	14	86	100
UJ991	30	5	0	0	1	0	24	2	13	0	3	21	79	100
UQ127	20	5	9	0	2	0	22	15	4	0	0	23	77	100
UJ701	39	5	0	0	0	4	26	0	18	0	0	9	91	100
AB259	9	3	5	0	3	0	39	0	22	0	0	0	100	100
UJ940	35	2	0	0	0	0	17	26	16	0	0	4	96	100

UJ321	34	1	0	4	0	5	26	10	3	11	2	4	96	100
UJ616	35	3	0	0	3	0	45	0	10	0	0	5	95	100
AB665	45	4	0	0	0	4	27	0	12	3	0	6	94	100
UJ699	69	0	6	8	0	0	3	4	0	0	3	8	92	100
UJ88	30	3	0	0	7	0	24	0	16	0	0	8	92	100
UJ1001	42	4	0	0	2	0	21	7	14	0	0	10	90	100
UJ1024	49	2	0	3	3	0	10	4	0	14	7	10	90	100
UJ110	43	0	4	0	6	0	8	7	0	21	0	11	89	100
UJ108	39	0	0	0	4	0	19	0	0	20	0	12	88	100
UJ958	44	1	0	0	0	0	26	5	10	0	3	12	88	100
UJ146	29	2	0	0	4	0	25	18	6	4	0	14	86	100
UJ1111	40	3	0	0	4	0	18	6	6	9	0	14	86	100
UJ151	37	0	5	0	6	0	16	5	0	15	0	15	85	100
UJ1128	33	4	0	0	0	0	26	6	10	4	0	16	84	100
UJ867	35	2	0	0	0	0	24	7	10	5	0	17	83	100
UJ282	59	1	0	2	0	0	2	0	0	9	9	17	83	100
UJ617	42	0	7	0	13	0	15	3	0	0	3	17	83	100
UJ873	23	1	0	0	0	0	43	9	7	0	0	18	82	100
AB472	43	0	0	2	7	0	6	7	0	13	2	19	81	100
UJ612	45	2	0	0	0	0	26	0	6	0	0	20	80	100
UJ126	40	0	0	0	3	0	10	3	0	14	10	21	79	100
UJ94	27	4	0	0	0	0	16	18	13	0	0	21	79	100
UJ866	51	4	0	2	0	0	10	0	6	0	0	22	78	100
UJ651	20	4	0	4	12	0	3	5	4	20	5	23	77	100
UJ318	41	1	0	0	0	0	14	3	0	11	5	24	76	100
UJ89	32	2	0	0	0	0	20	6	8	0	0	24	76	100
UJ96	41	0	0	0	2	0	3	0	0	13	10	25	75	100
UJ610	33	4	0	3	0	0	24	0	8	0	1	27	73	100
UJ1009	42	3	0	0	1	0	15	6	7	0	0	28	72	100
UJ977	15	3	20	0	4	0	10	8	3	9	0	28	72	100
UJ703	35	0	0	6	8	0	13	0	0	0	5	28	72	100
AB397	40	0	0	6	6	0	8	0	0	9	0	28	72	100
UJ639	40	0	0	0	0	0	8	0	0	15	6	28	72	100
AB207	41	2	2	3	5	0	4	0	0	14	0	29	71	100
UJ622	29	4	0	0	0	0	19	6	11	0	1	29	71	100
UJ692	34	0	0	3	0	0	15	6	12	0	0	30	70	100
UQ45	54	0	2	4	4	0	6	0	0	0	0	30	70	100
UJ1119	36	2	0	2	0	0	13	6	5	4	0	31	69	100
UJ83	47	0	0	0	0	0	4	0	0	10	7	31	69	100
UJ84	37	0	0	4	2	0	7	0	0	11	6	32	68	100
UJ961	23	2	0	0	3	0	19	9	12	0	0	32	68	100

UJ759	30	4	0	3	0	0	15	2	12	0	1	33	67	100
UJ855	44	2	0	5	0	0	5	0	0	0	2	34	67	100
UJ85	31	3	0	3	0	0	5	0	0	13	11	35	65	100
UJ705	53	0	0	0	0	0	7	0	0	3	0	37	63	100
AB277	20	0	4	9	4	0	16	0	2	0	0	39	61	100
UJ921	41	0	0	3	0	0	5	3	0	5	0	40	60	100
UJ158	33	0	6	0	11	0	9	0	0	0	0	41	59	100
AB667	26	0	3	9	6	0	15	0	0	0	0	41	59	100
AB168	22	0	4	0	6	0	8	0	0	15	3	42	58	100
AB253	39	0	2	2	0	0	3	0	0	8	3	42	58	100

Note: Qz = Quartz, Kfs = K-feldspars, Ms = Miscovite, Hem = Hematite, Ap = Apatite, Cpx = clino-pyroxen, Geh = Gehlenite, Spl = Spinel, Mul = Mullite, and Σ Xls = Sum phases.

H.2: The Middle Islamic period

sample #	Qz	Cal	Kfs	Ms	Hem	Ap	An	Cpx	Geh	Spl	Mul	glass	Σ Xls	Σ weight %
M.I.sherds														
UQ.196	6	33	0	0	1	6	6	6	6	0	0	29	71	100
AB.86	16	32	3	0	3	8	4	7	0	0	0	26	74	100
AB.172	21	27	0	2	2	12	5	0	2	0	0	20	80	100
UQ.17	7	19	0	0	0	9	0	10	28	0	0	16	84	100
HM.227	19	18	0	3	2	3	13	5	5	3	0	30	70	100
UQ.274	7	16	0	0	1	6	26	0	24	0	0	19	81	100
AB.650	20	16	0	2	0	3	17	6	6	0	0	30	70	100
UQ.92	15	10	3	0	4	6	24	12	14	0	0	3	97	100
AB.199	25	9	0	0	5	0	11	6	7	0	1	34	66	100
AB2.87	28	9	0	7	9	0	5	0	21	0	0	8	92	100
UQ.88	51	8	0	5	9	0	2	2	0	10	2	6	94	100
UQ.90	14	8	0	0	4	0	0	0	17	0	0	24	76	100
AB.776	18	7	6	2	3	3	17	9	7	0	0	27	73	100
UQ.77	13	7	0	0	4	0	20	0	11	0	0	31	69	100
Tu.18	14	5	0	0	2	5	25	0	6	0	0	24	77	100
AB.482	50	4	0	3	4	0	12	4	5	6	2	11	89	100
AB.511	46	4	4	3	6	0	4	9	3	7	4	11	89	100
UQ.181	61	0	4	4	7	0	0	0	0	7	0	16	84	100
AB.488	50	0	3	6	8	0	4	3	0	7	3	16	84	100
AB.267	23	3	2	0	3	3	29	0	10	0	0	17	83	100
UQ.81	62	0	7	3	5	0	0	0	0	0	3	18	82	100
AB.174	49	0	0	0	3	0	4	0	0	6	14	21	79	100
AB.571	47	0	8	5	7	0	3	0	0	6	0	23	77	100
AB.506	41	0	4	0	2	0	3	6	0	13	7	24	76	100
AB.701	38	0	5	5	11	0	0	0	0	9	0	26	74	100
UQ.267	52	0	2	6	6	0	3	0	5	0	0	26	74	100

AB.616	17	4	0	2	3	4	31	1	5	3	0	27	73	100
UQ.45	54	0	2	4	4	0	0	0	0	0	0	30	70	100
UQ.4	28	0	3	3	4	0	2	4	0	19	6	32	68	100
AB.130	50	0	0	0	3	0	9	0	1	0	3	34	66	100
AB.106	50	0	0	0	3	0	9	0	1	0	3	34	66	100
UQ.95	42	0	0	3	11	0	2	1	2	0	1	35	65	100
AB.431	45	0	0	3	5	0	1	0	0	0	7	40	60	100
UQ.29	46	0	3	2	0	0	0	0	0	0	2	40	60	100
UQ.15	23	0	5	0	7	0	3	0	6	0	2	53	47	100

H.3: The Late Islamic period

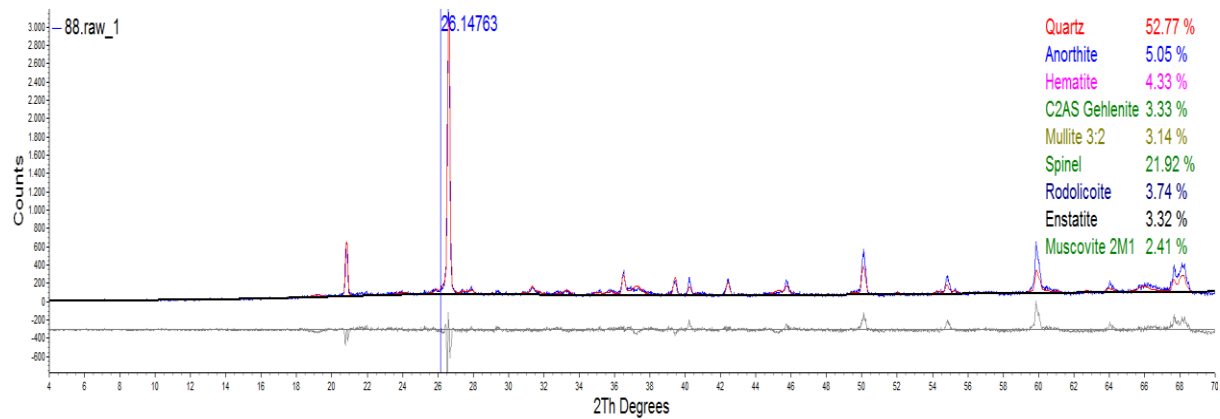
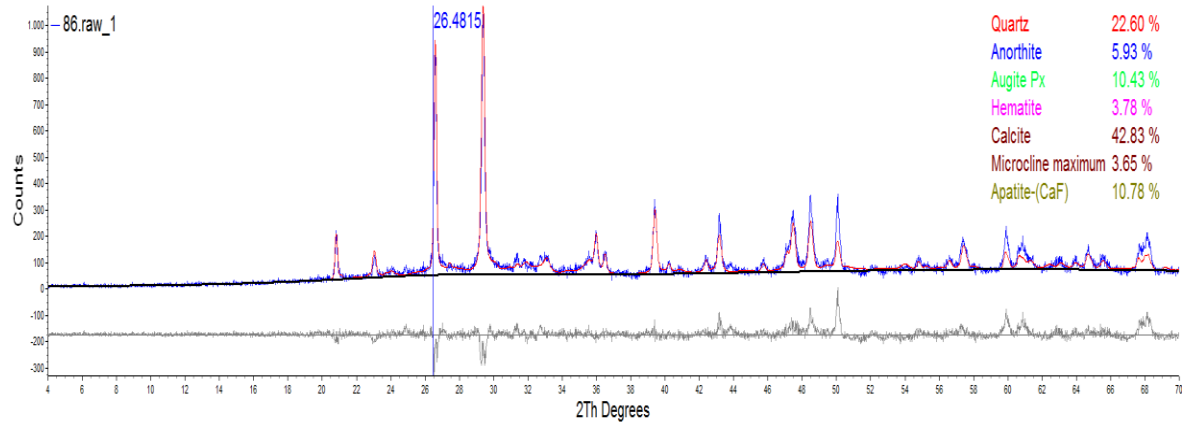
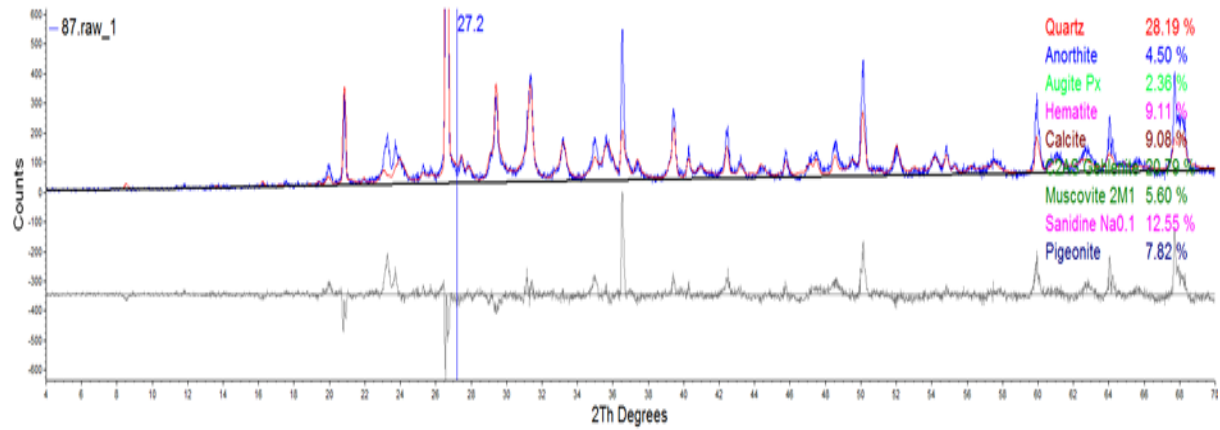
sample #	Qz	Cal	Kfs	Ms	Hem	Ap	An	Cpx	Geh	Spl	Mul	glass	Σ Xls	Σ weight %
L.I.sherds														
UQ72	8	71	0	4	0	0	2	3	0	0	0	13	87	100
UQ235	12	51	8	8	0	0	12	0	0	0	2	7	93	100
UQ191	15	35	3	5	0	4	1	0	0	0	3	30	70	100
UQ61	8	33	0	0	3	9	5	0	20	0	0	23	77	100
UQ137	13	22	0	0	0	7	16	0	12	0	0	30	70	100
UQ27	20	15	8	2	2	0	11	2	0	0	0	40	60	100
UQ138	16	15	5	0	0	0	12	0	6	0	0	46	54	100
UQ136	8	13	0	0	1	0	14	7	20	0	0	36	64	100
AB402	18	11	0	4	2	0	18	0	11	0	0	31	69	100
UQ198	23	11	10	13	5	0	10	0	0	0	0	28	72	100
AB430	19	9	0	5	3	3	15	0	3	0	0	43	57	100
AB441	16	8	0	0	2	5	28	10	12	0	0	18	82	100
UQ73	26	8	2	4	0	10	24	10	0	0	3	13	87	100
AB159	46	8	13	4	7	0	13	0	0	0	0	11	89	100
UQ152	13	6	10	2	0	5	17	7	3	3	0	33	67	100
UQ115	10	6	0	7	4	0	5	5	0	0	0	35	65	100
AB300	21	5	0	2	4	0	19	0	7	2	0	40	60	100
AB551	39	5	4	3	7	0	3	9	0	14	5	12	88	100
UQ135	18	0	6	0	4	3	40	17	2	9	0	2	98	100
UQ7	41	0	0	5	5	0	15	0	0	0	22	8	92	100
AB462	54	0	0	0	5	0	10	0	2	9	4	11	89	100
AB463	40	0	0	0	7	0	12	9	0	12	10	11	89	100
AB344	47	0	3	3	4	0	3	0	0	14	7	13	87	100
AB445	43	2	0	0	3	0	13	0	3	5	14	13	87	100
UQ31	19	0	7	0	3	0	22	30	4	0	0	14	86	100
UQ182	50	0	9	0	4	0	0	5	0	7	11	14	86	100
UQ49	41	2	3	5	5	0	2	6	9	0	6	16	84	100
AB470	39	2	0	3	6	0	10	0	0	14	2	16	84	100

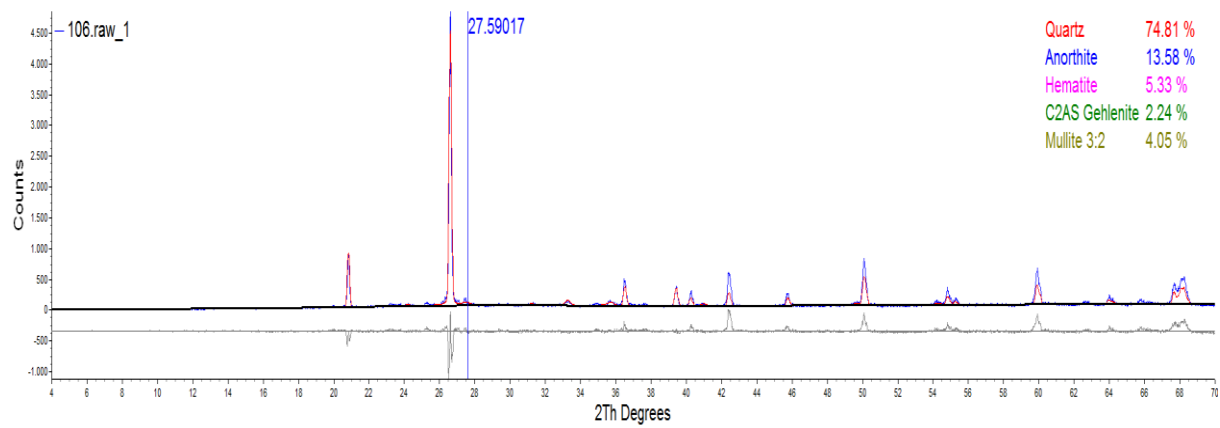
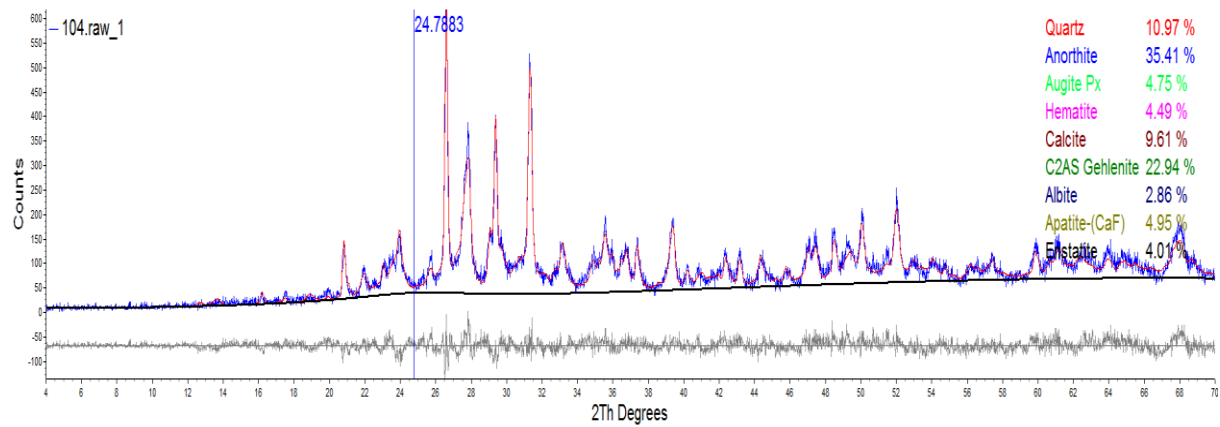
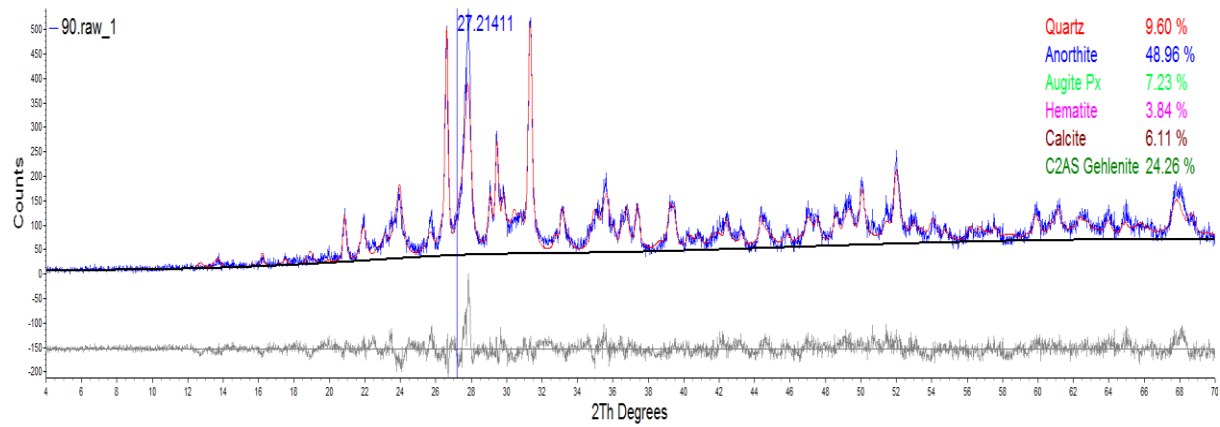
AB170	46	0	0	0	5	0	10	0	0	16	7	16	84	100
AB488	50	0	3	6	8	0	4	3	0	7	3	16	84	100
AB652	46	2	10	3	13	0	0	0	3	4	2	16	84	100
AB142	51	0	0	0	3	0	6	3	0	7	10	17	83	100
UQ172	24	0	11	12	7	0	5	6	0	10	0	18	82	100
UQ14	55	0	0	2	9	0	4	0	0	8	3	18	82	100
UQ213	50	0	4	0	4	0	2	0	0	14	8	18	82	100
AB475	37	0	0	4	7	0	9	7	5	8	4	19	81	100
AB472	43	0	0	2	7	0	6	7	0	13	2	19	81	100
UQ12	55	0	0	2	9	0	3	0	0	8	3	19	81	100
AB561	40	0	11	0	7	0	0	0	0	6	16	19	81	100
UQ210	58	0	0	4	3	0	12	0	0	0	3	19	81	100
UQ183	53	0	2	3	8	0	0	0	0	8	3	20	80	100
AB171	30	0	2	3	0	0	19	0	0	15	7	21	79	100
UQ16	35	0	10	5	6	0	10	0	0	13	0	21	79	100
AB287	44	0	0	3	11	0	9	0	0	7	5	21	79	100
UQ30	35	0	0	0	5	0	8	5	0	21	5	23	77	100
UQ144	56	1	3	5	0	0	5	5	0	0	0	24	76	100
UQ28	45	0	0	0	7	0	5	2	0	11	6	24	76	100
AB228	22	0	0	0	3	2	34	0	5	0	0	25	75	100
AB448	44	1	0	2	3	0	4	3	2	10	4	25	75	100
AB206	52	0	0	9	6	0	3	0	0	5	0	26	74	100
UQ76	54	0	6	4	5	0	3	0	0	0	2	26	74	100
AB133	38	2	0	3	9	0	12	0	9	0	0	26	74	100
AB205	19	3	0	1	4	0	30	8	8	0	0	27	73	100
AB189	42	0	0	2	5	0	6	0	0	13	5	27	73	100
AB487	39	0	0	3	10	0	13	0	4	0	4	28	72	100
UQ271	35	0	0	0	1	0	32	0	0	0	4	28	72	100
UQ157	45	3	0	0	4	0	16	0	4	0	0	29	71	100
AB452	31	1	0	0	3	0	8	0	2	6	15	31	69	100
UQ13	47	0	0	0	12	0	7	0	0	0	2	31	69	100
UQ130	30	0	1	0	4	0	0	4	0	17	12	32	68	100
UQ147	44	0	0	0	2	0	7	0	1	0	9	33	67	100
AB196	48	0	0	2	1	0	6	0	0	5	4	34	66	100
UQ11	46	0	2	3	3	0	1	3	0	0	3	34	66	100
AB504	35	0	0	2	2	0	4	0	0	12	2	38	62	100
UQ184	35	0	2	2	6	0	0	0	0	9	2	41	59	100
UQ158	11	0	18	3	3	0	4	2	0	12	6	41	59	100
AB214	30	0	2	3	7	0	0	0	2	9	0	41	59	100
AB406	34	0	0	4	11	0	2	0	0	6	0	42	58	100
AB405	39	0	0	5	3	0	3	0	0	6	0	43	57	100

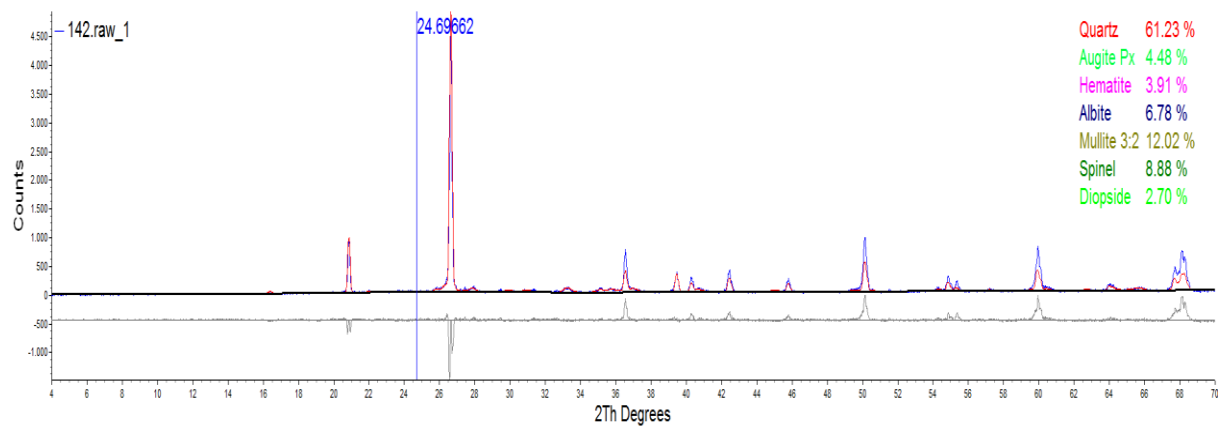
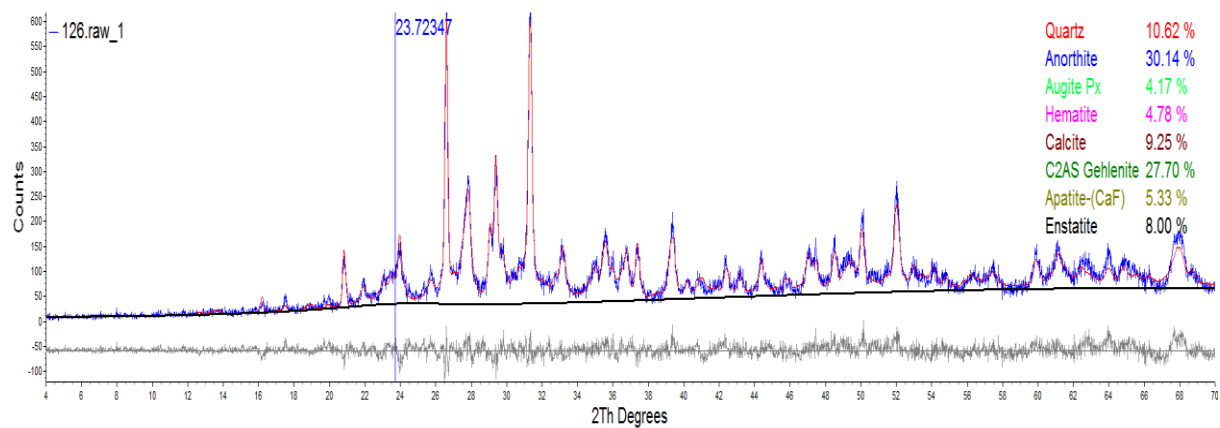
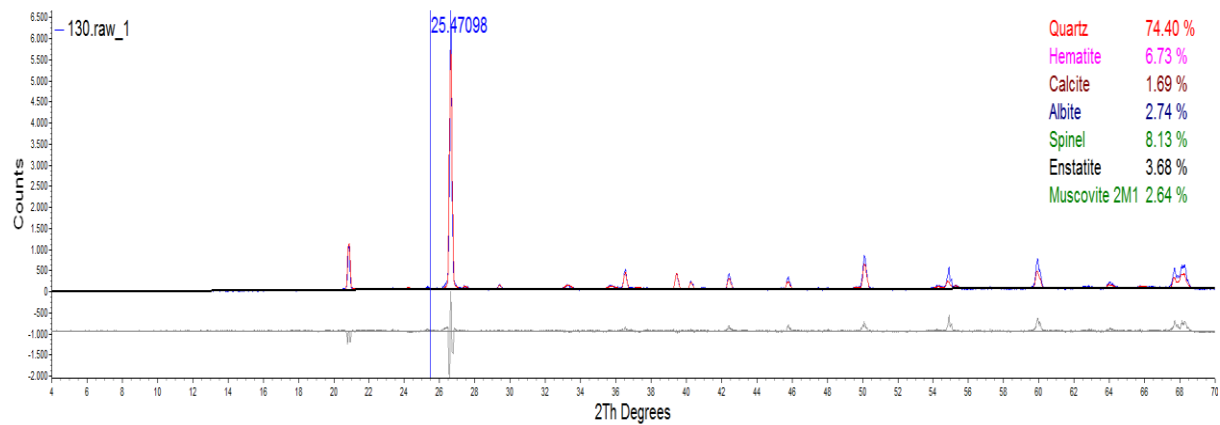
UQ34	32	0	2	6	3	0	5	4	2	0	0	46	54	100
AB186	31	2	0	0	5	0	8	5	0	0	0	47	53	100
AB188	37	0	0	2	0	0	0	2	0	5	3	47	53	100
AB150	30	0	3	0	3	0	0	0	0	6	5	52	48	100
AB588	26	0	4	2	1	0	0	0	0	10	5	52	48	100

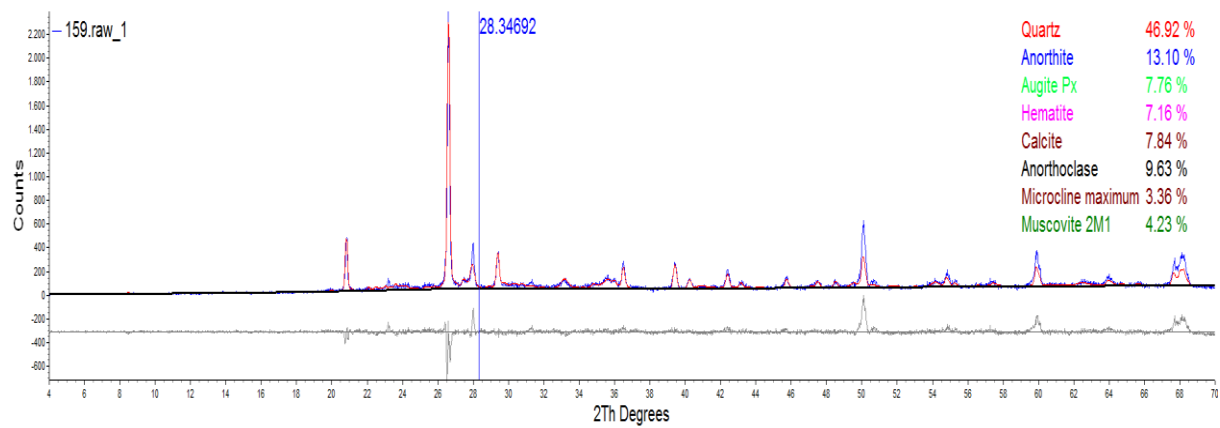
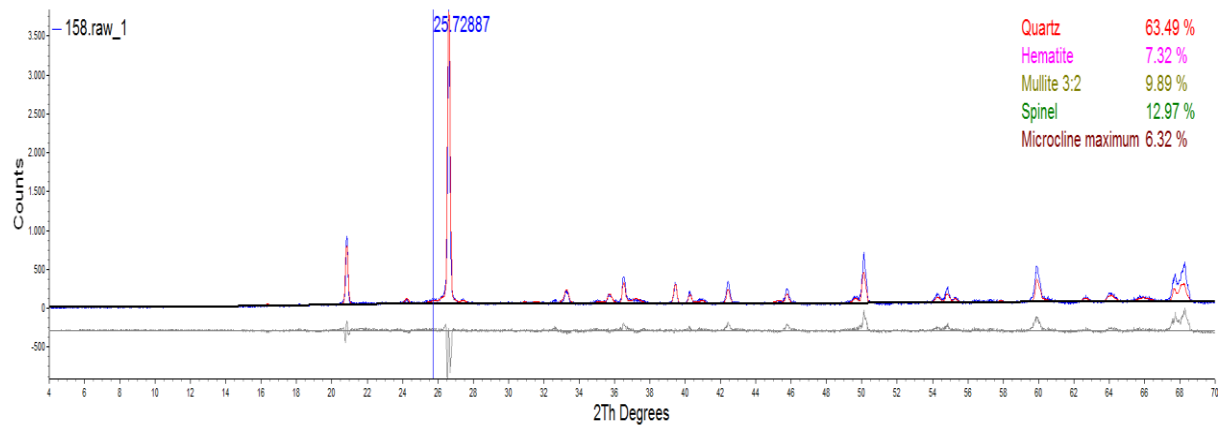
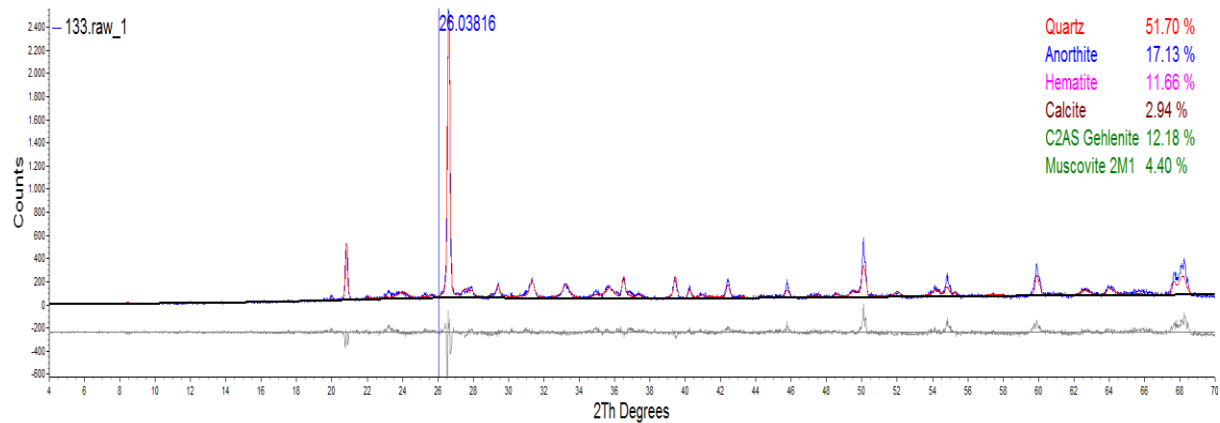
I: X-ray diffractograms of the studied samples according to site sequence.

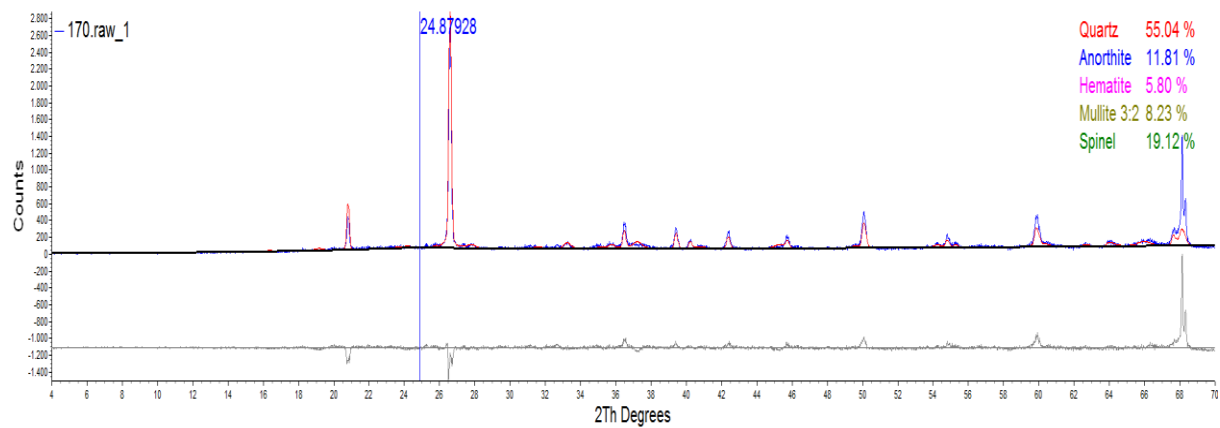
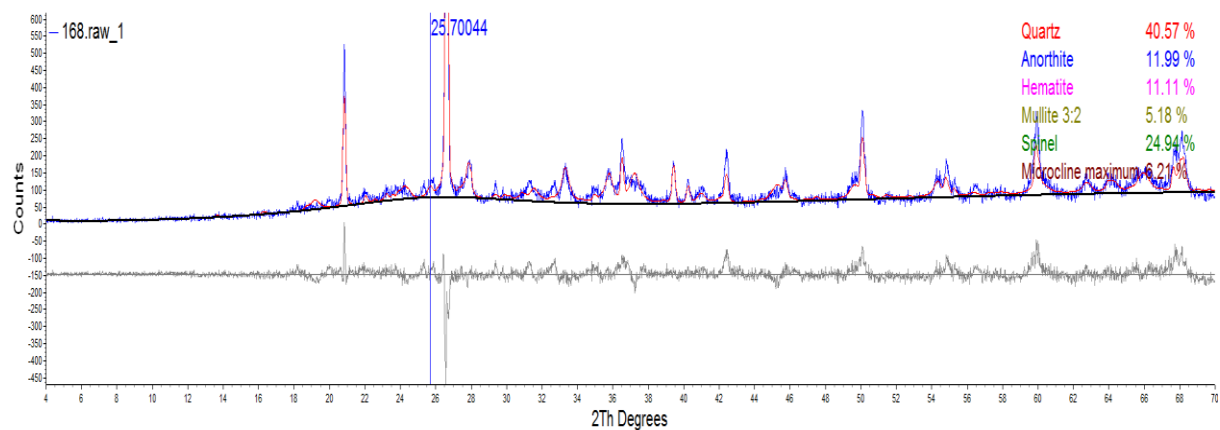
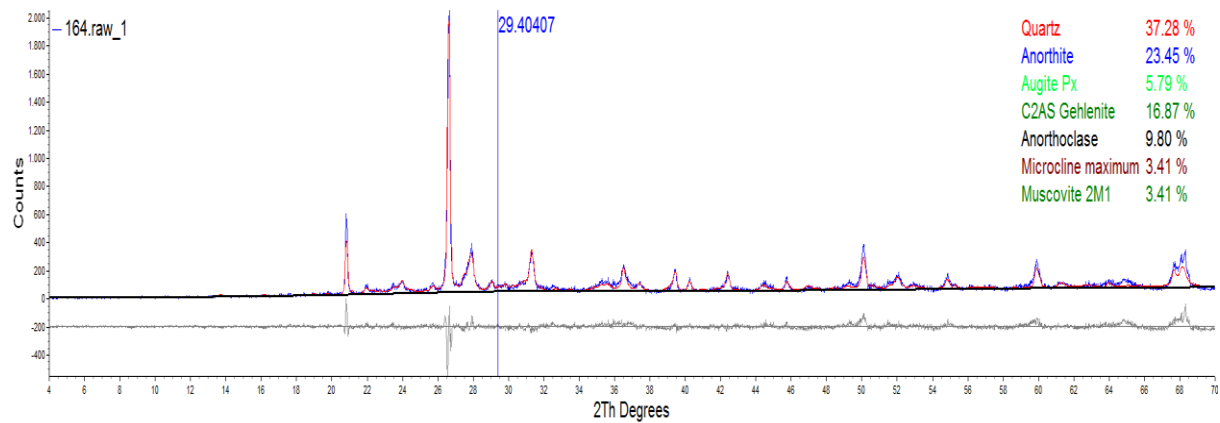
I.1: Abila samples diffractograms

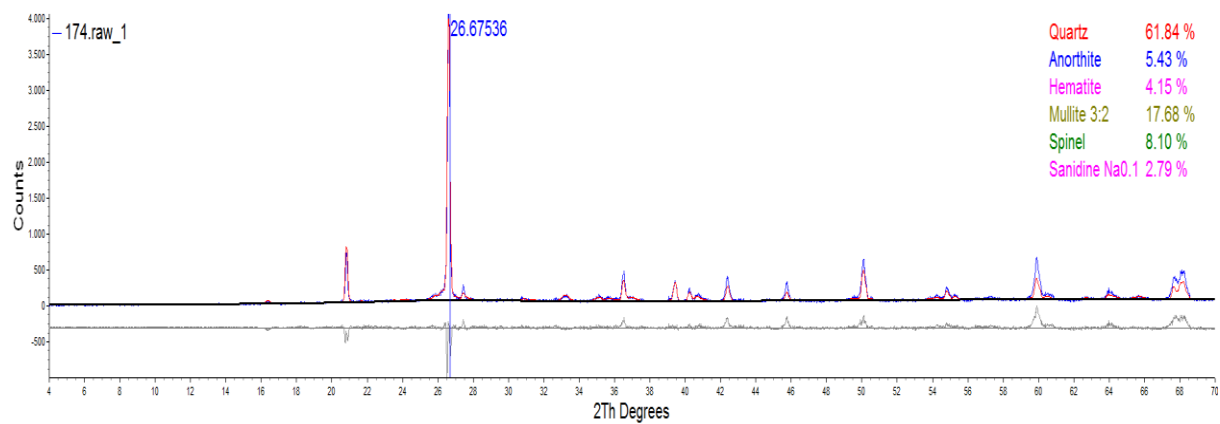
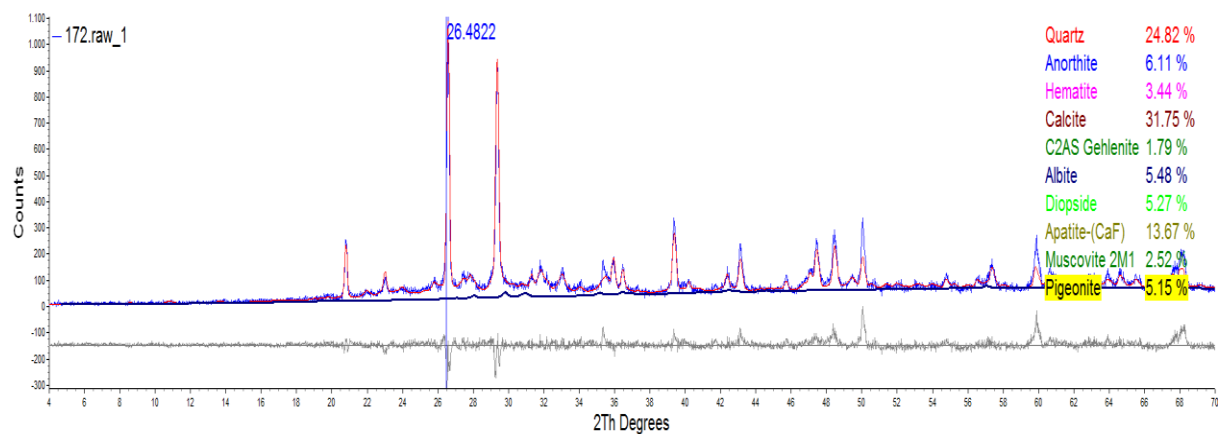
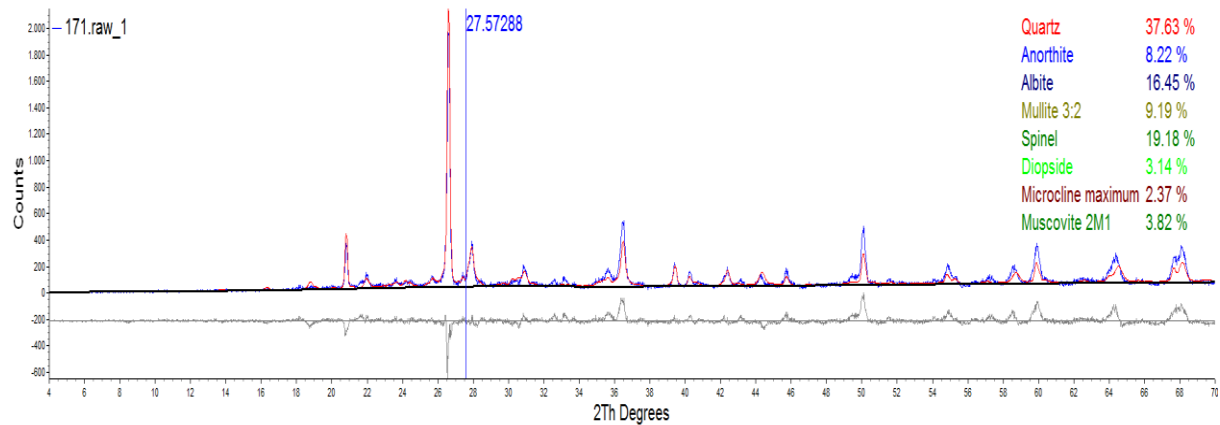


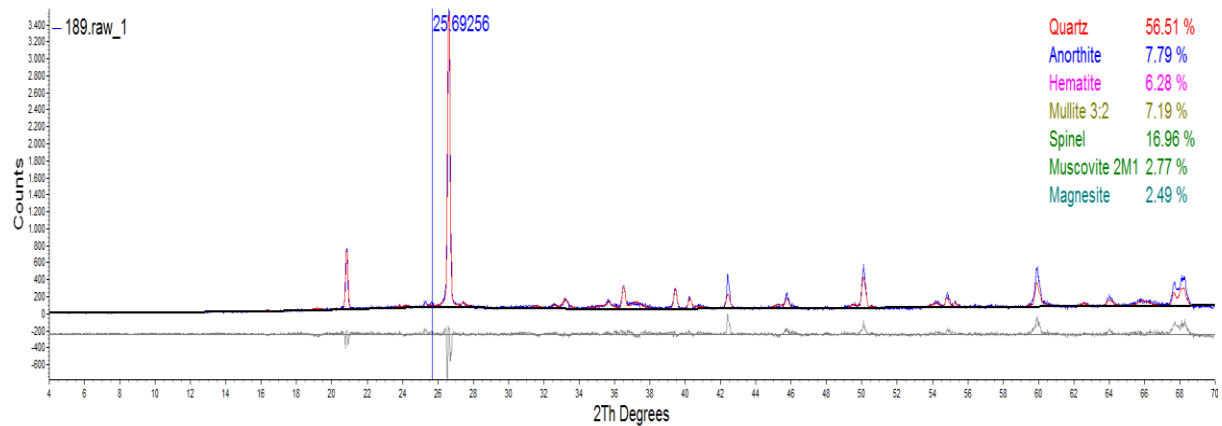
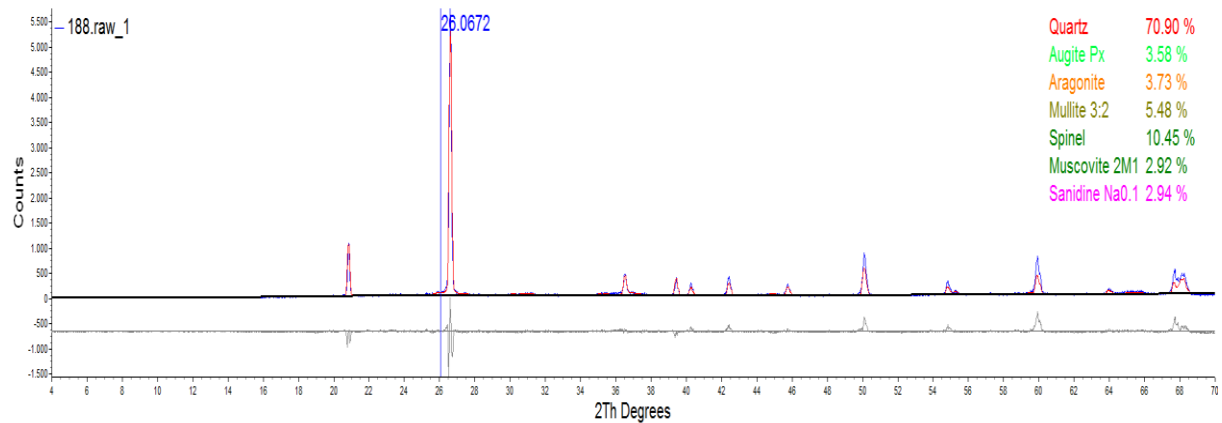
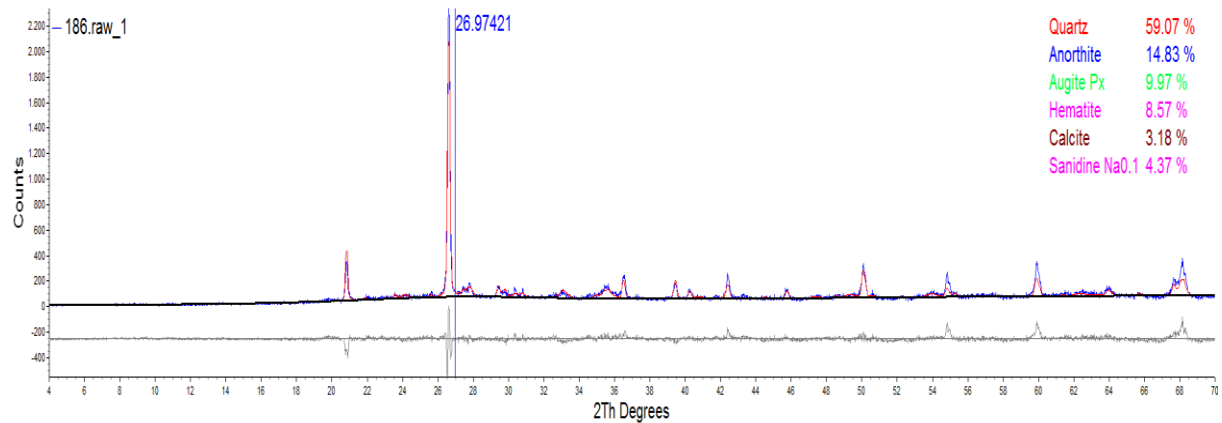


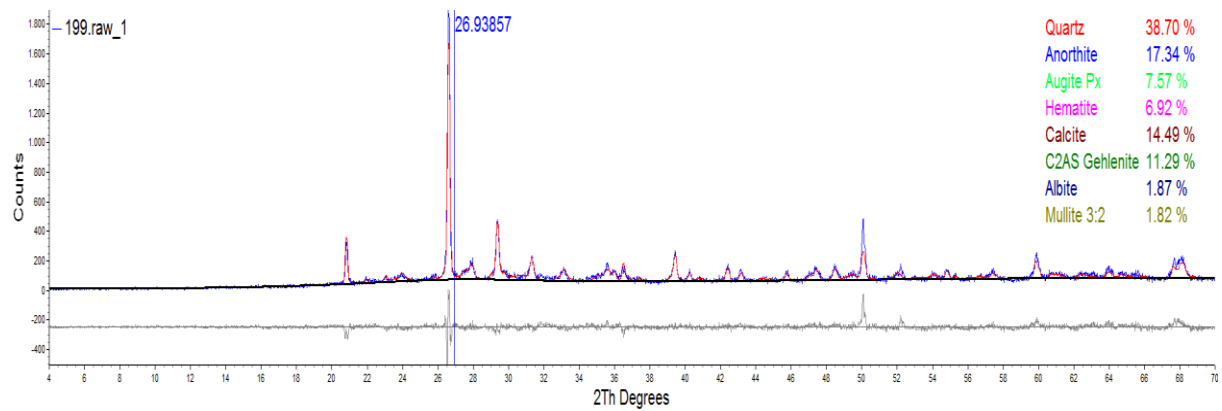
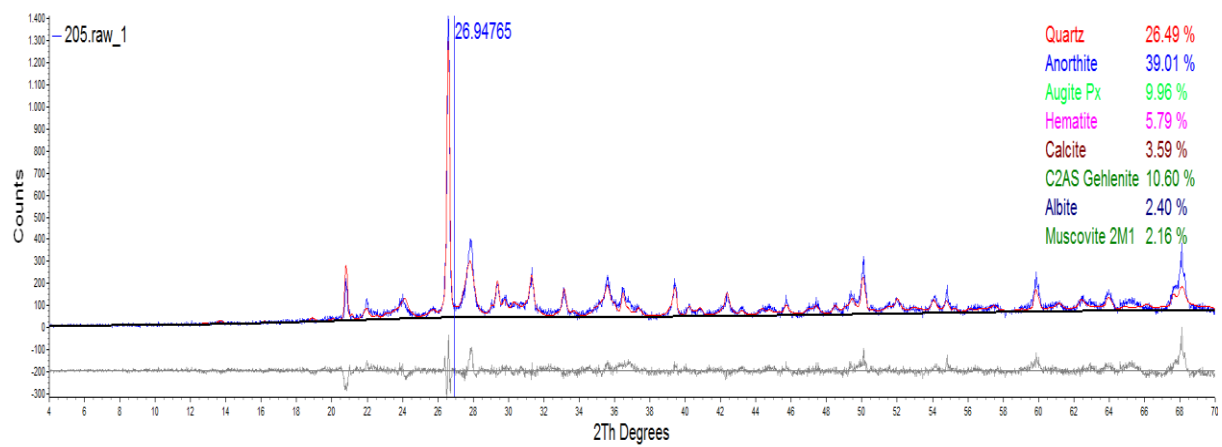
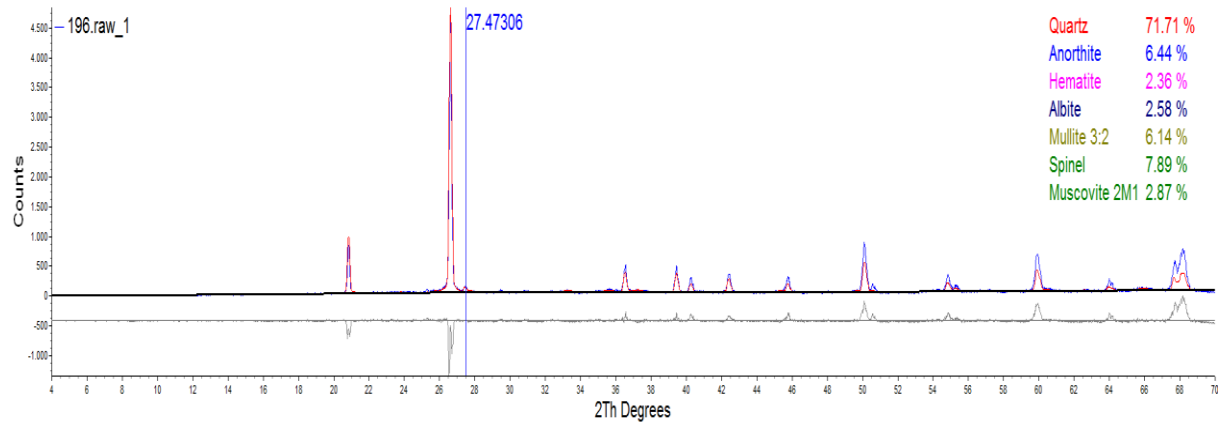


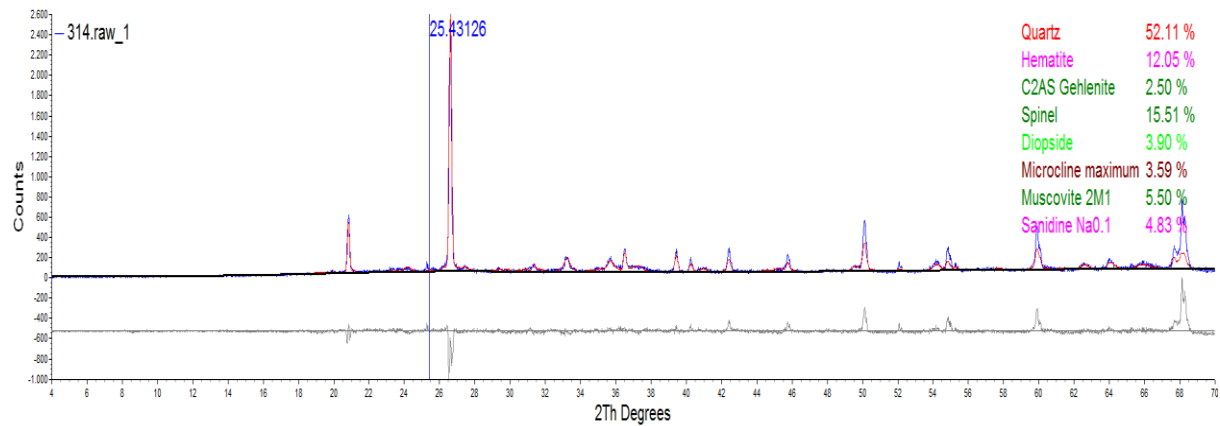
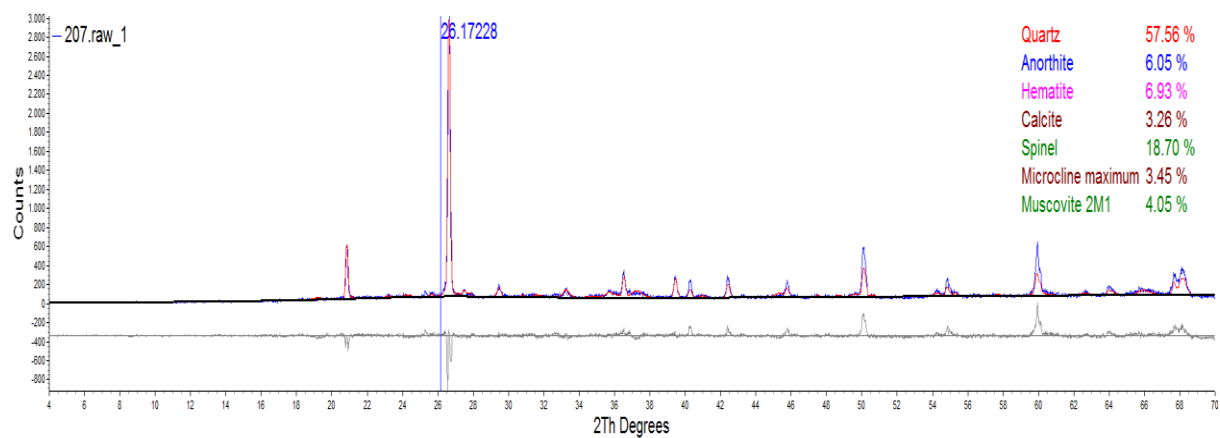
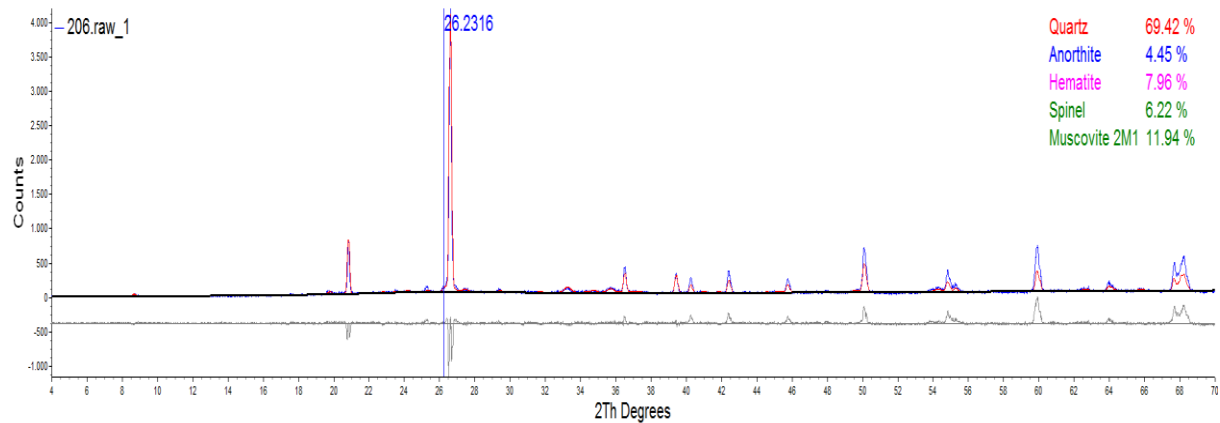


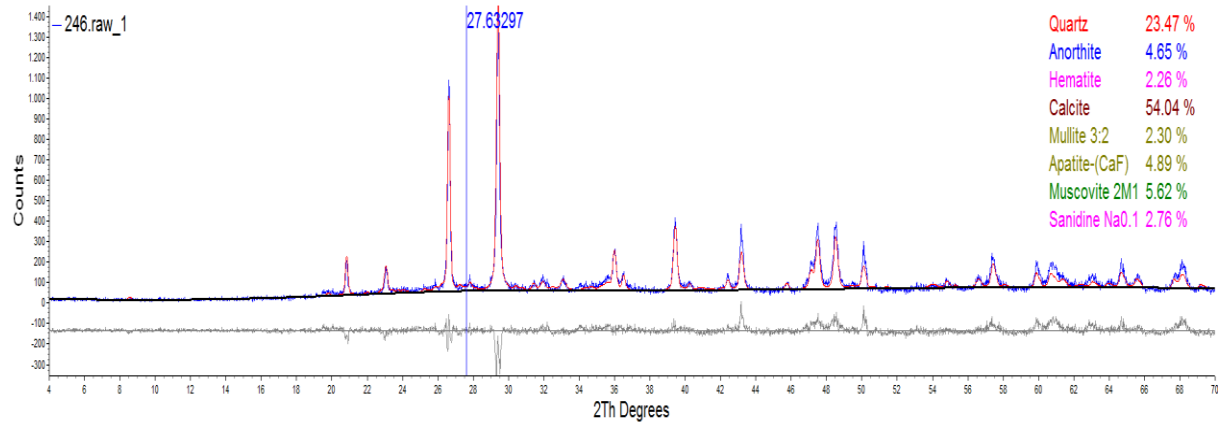
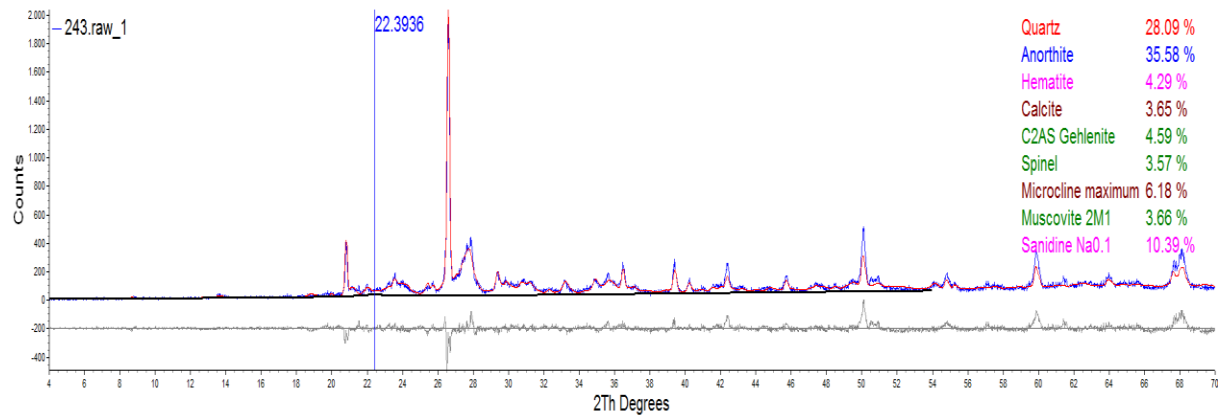
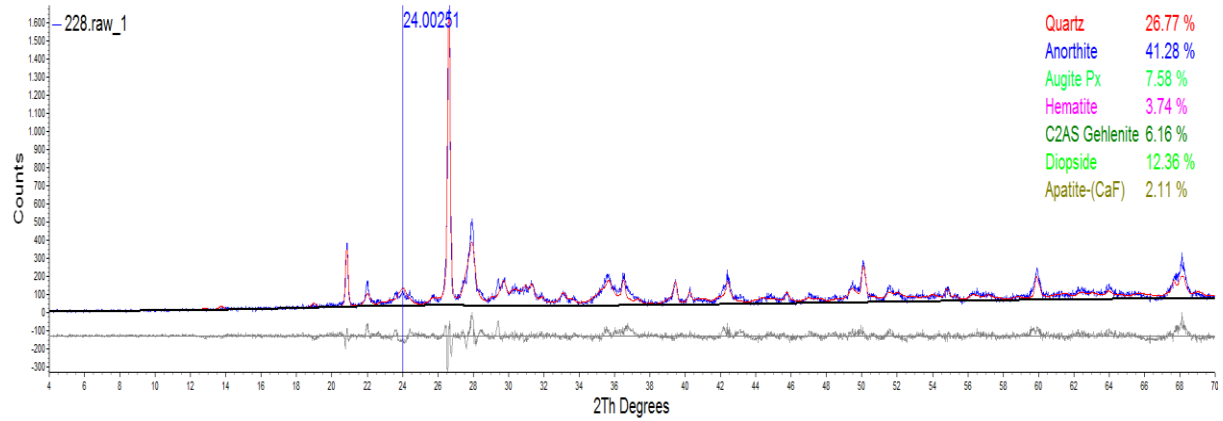


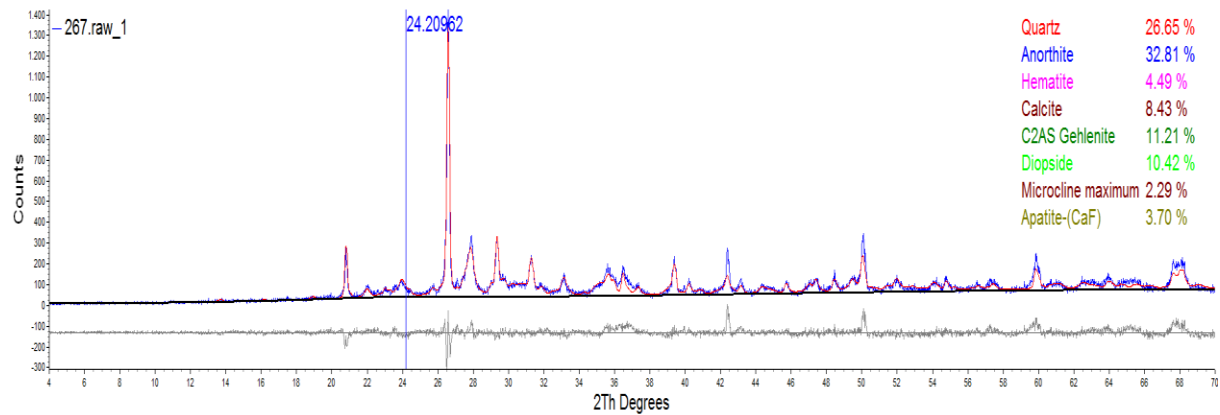
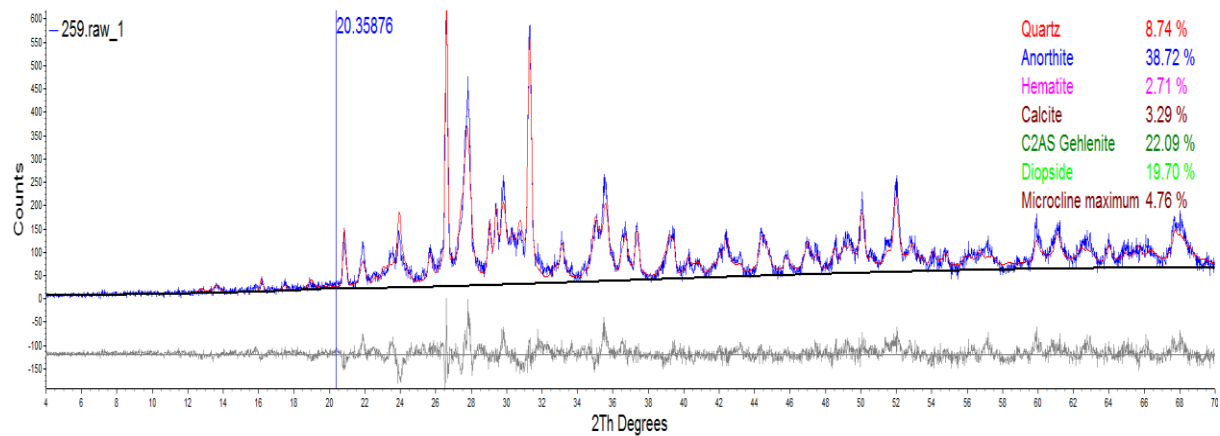
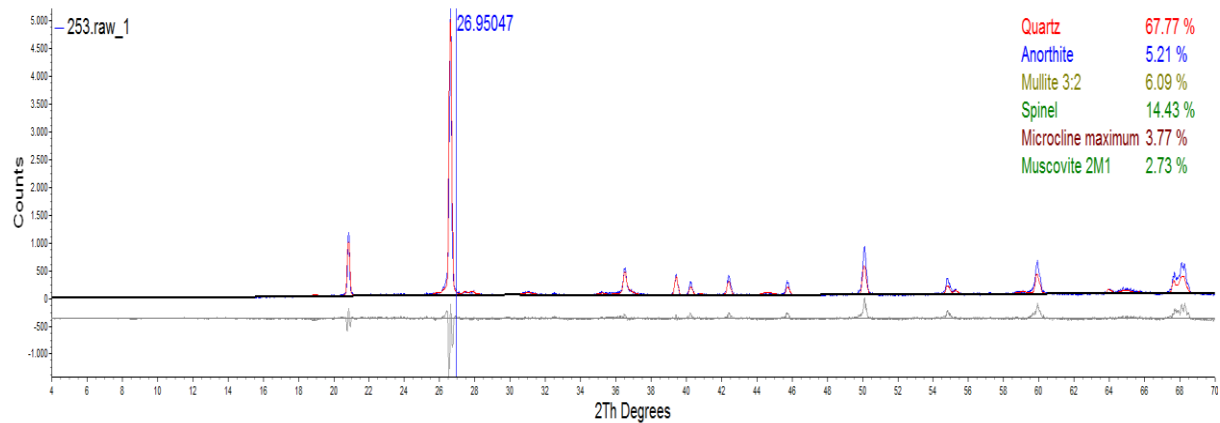


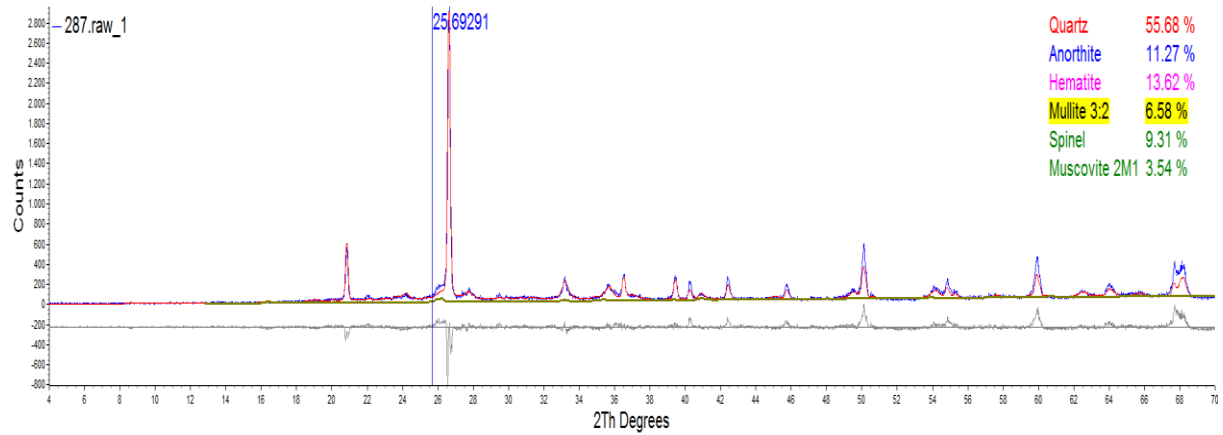
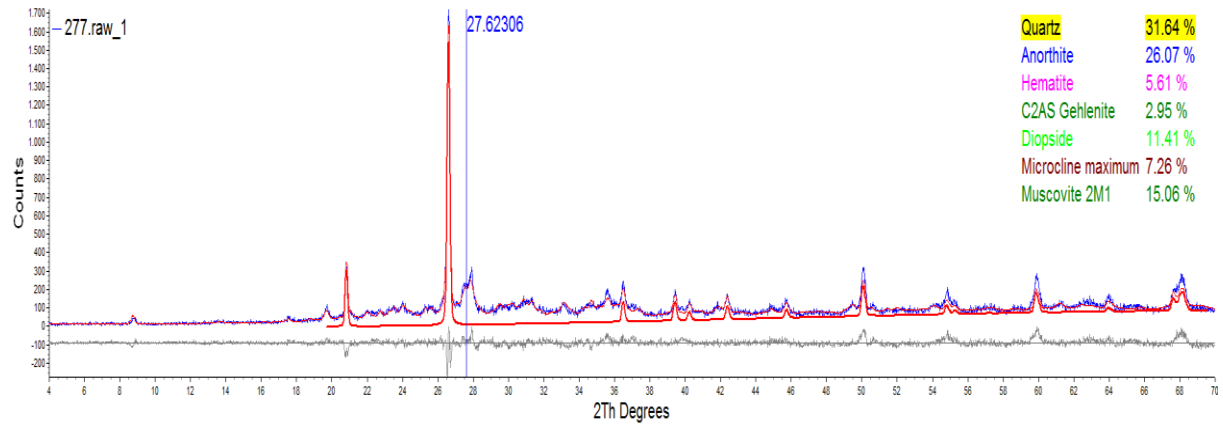
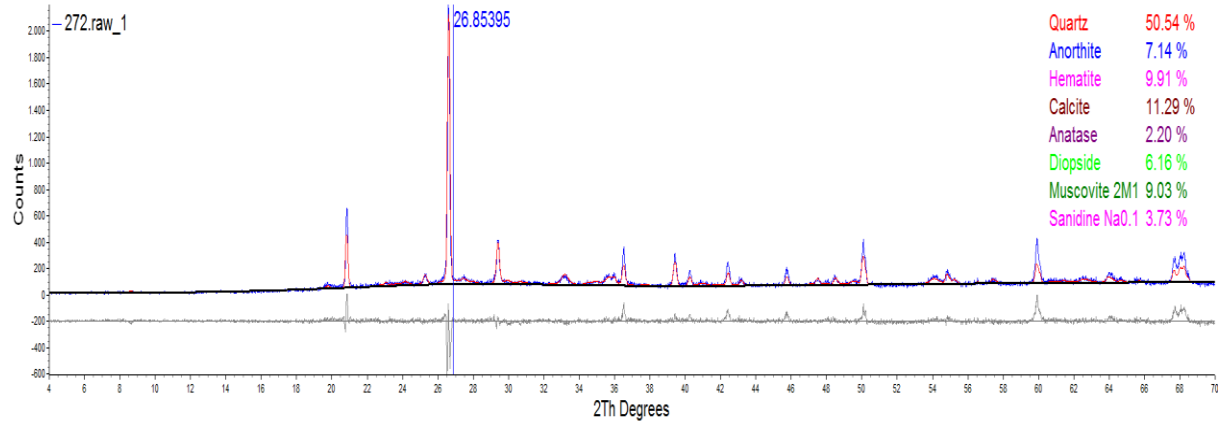


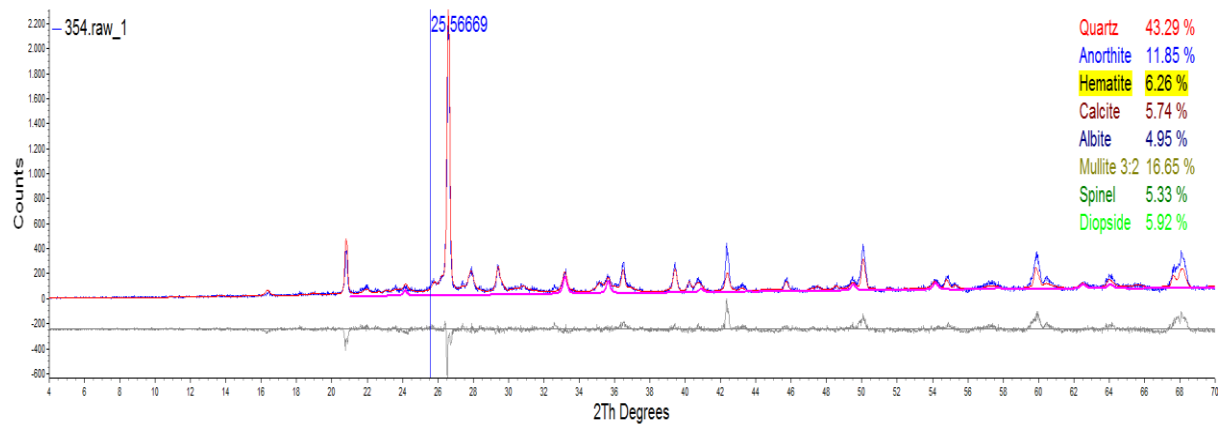
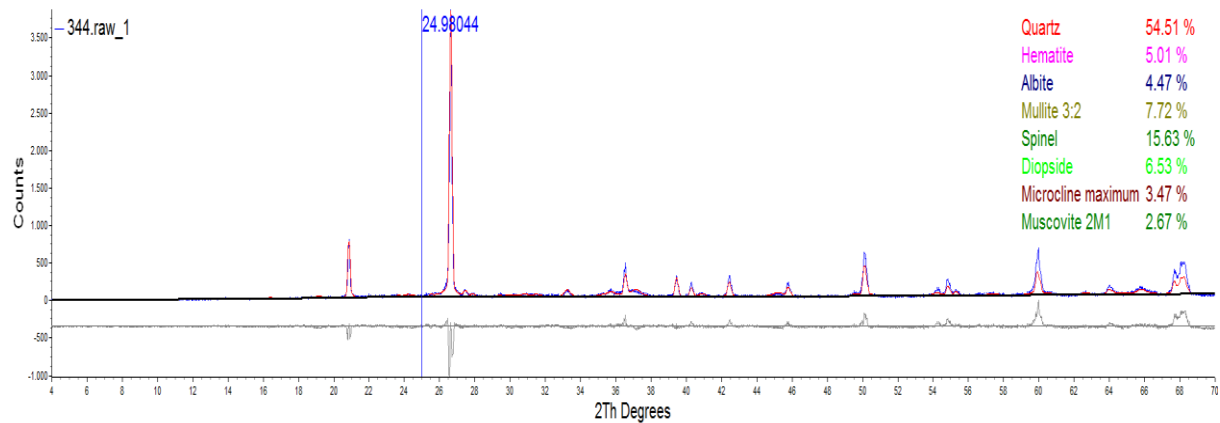
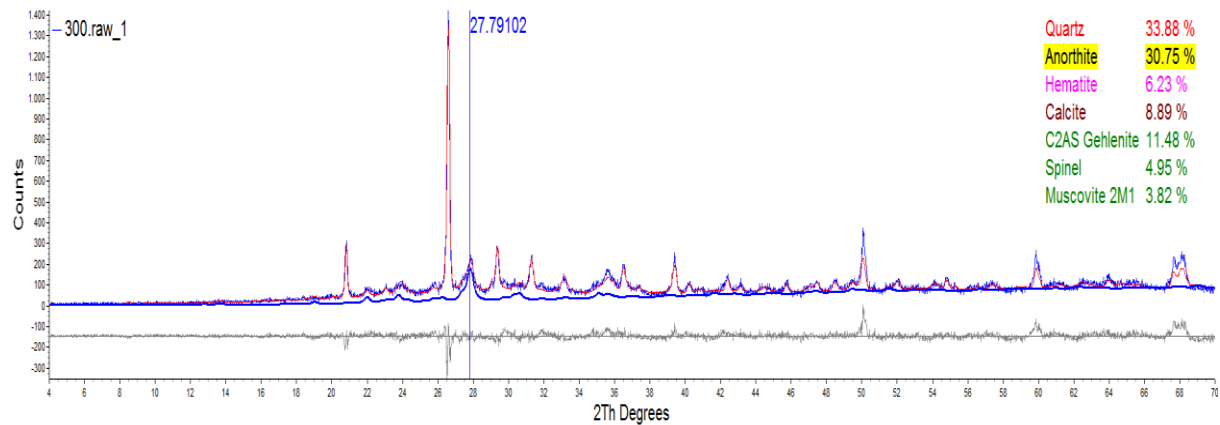


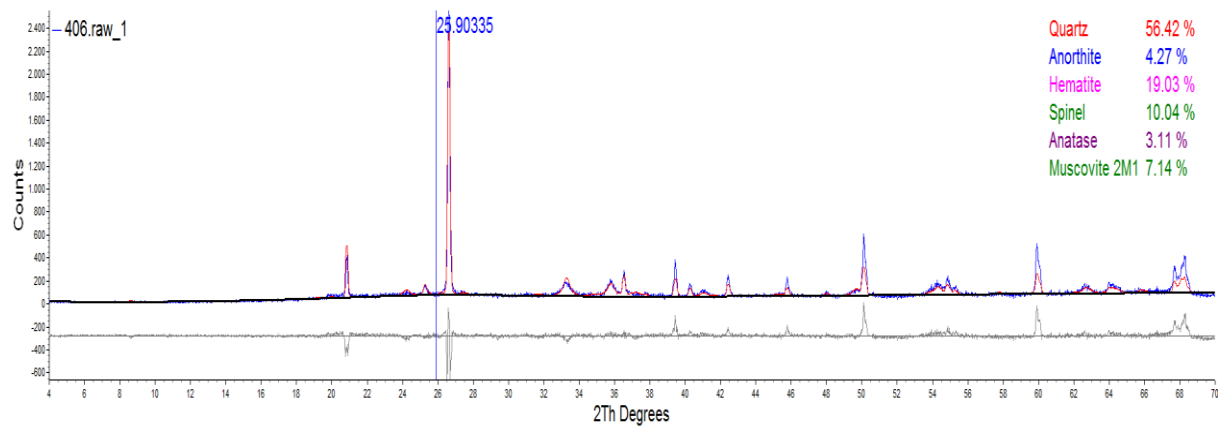
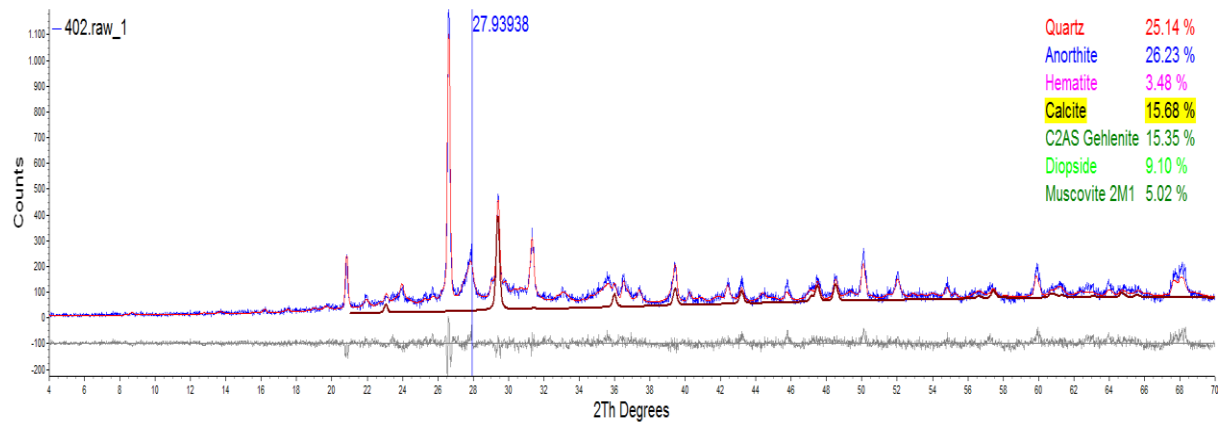
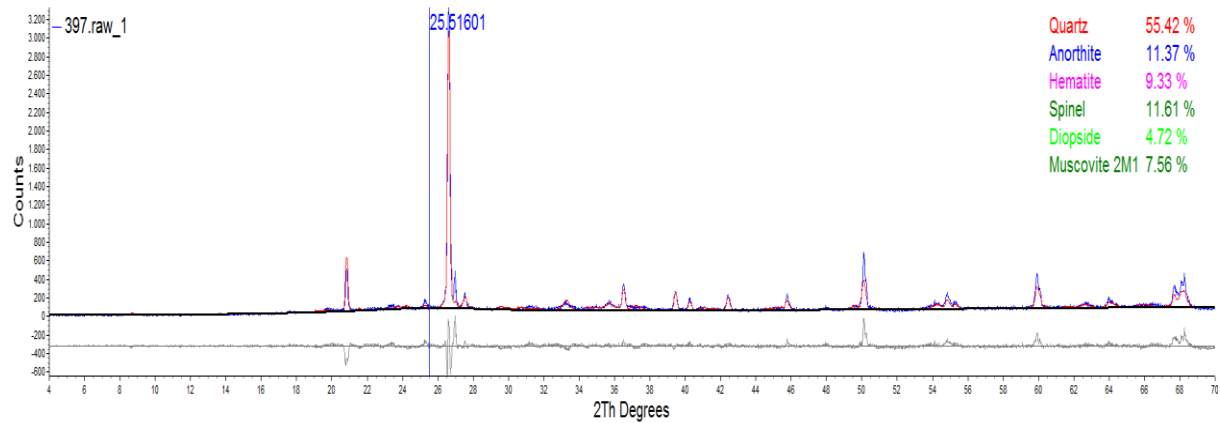


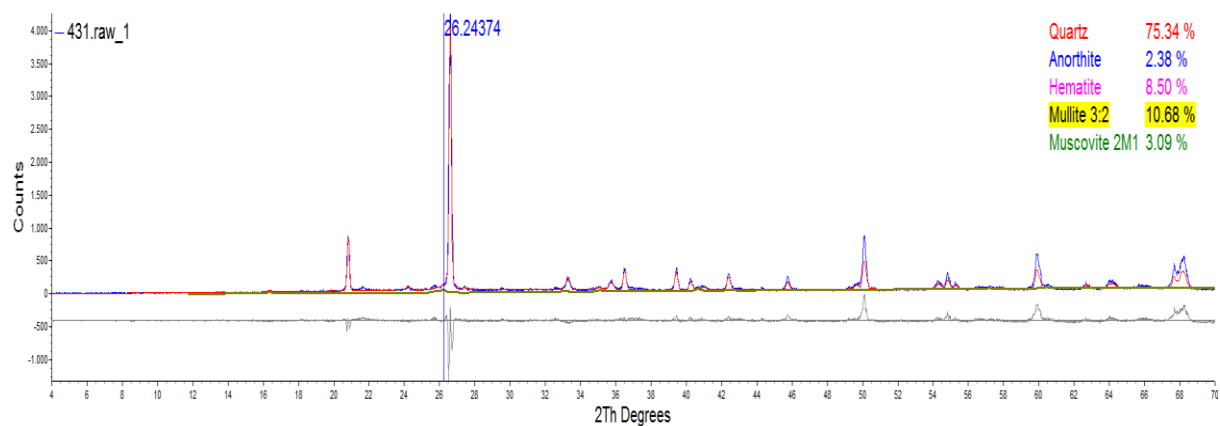
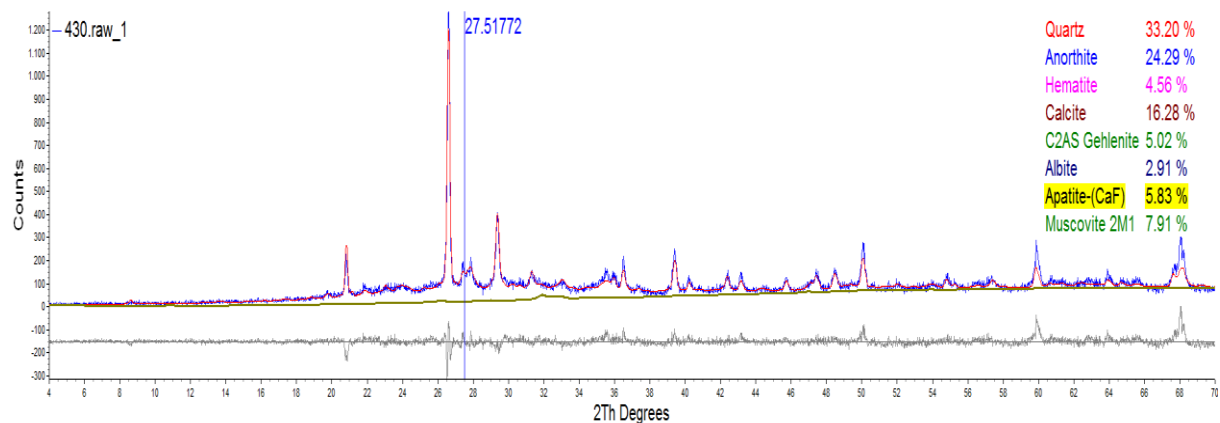
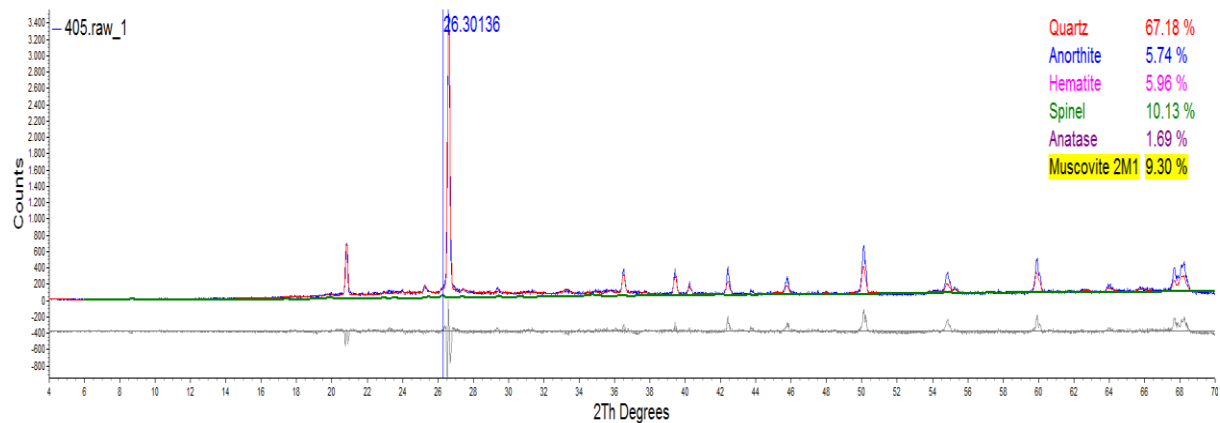


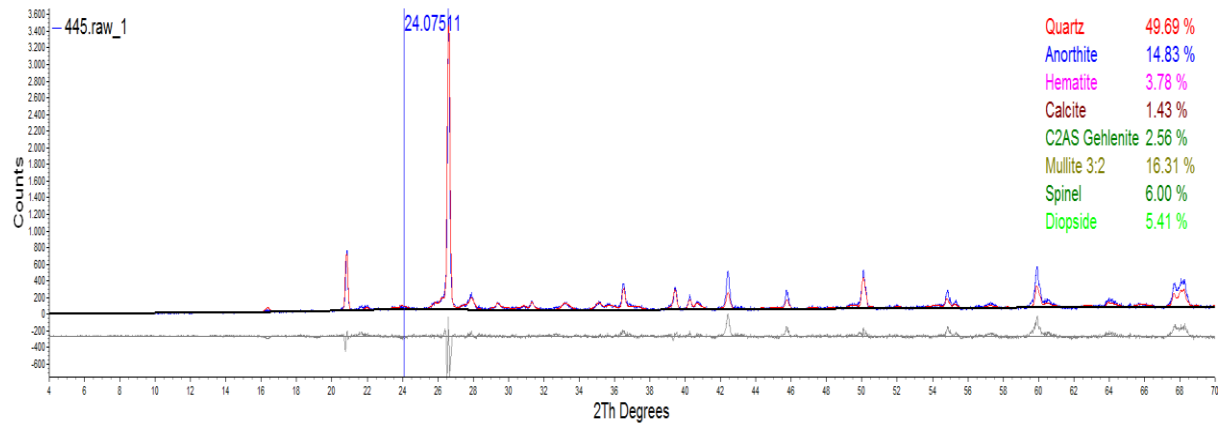
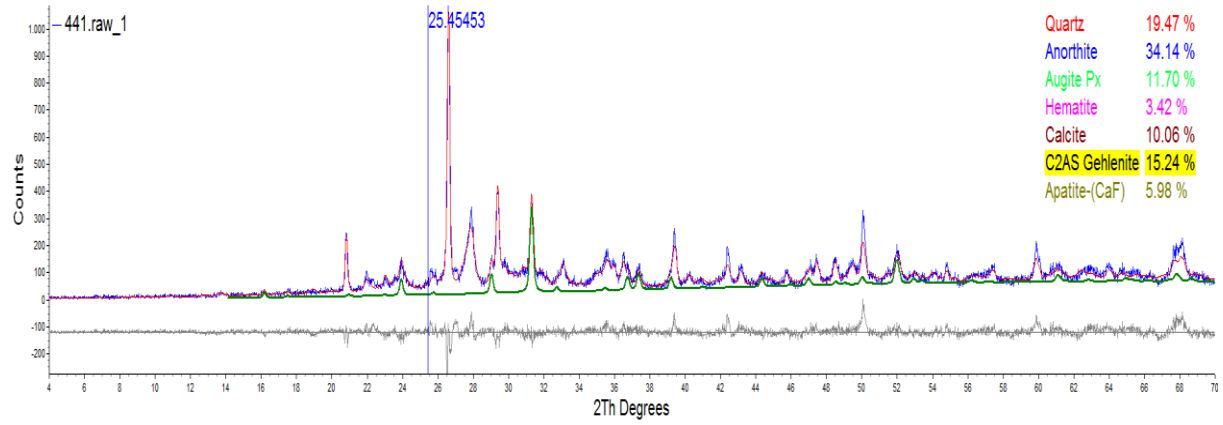
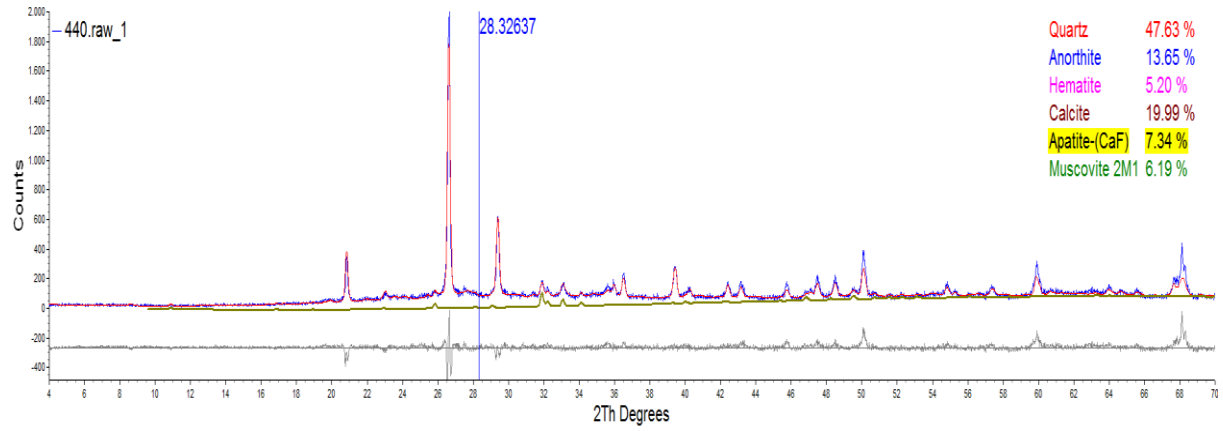


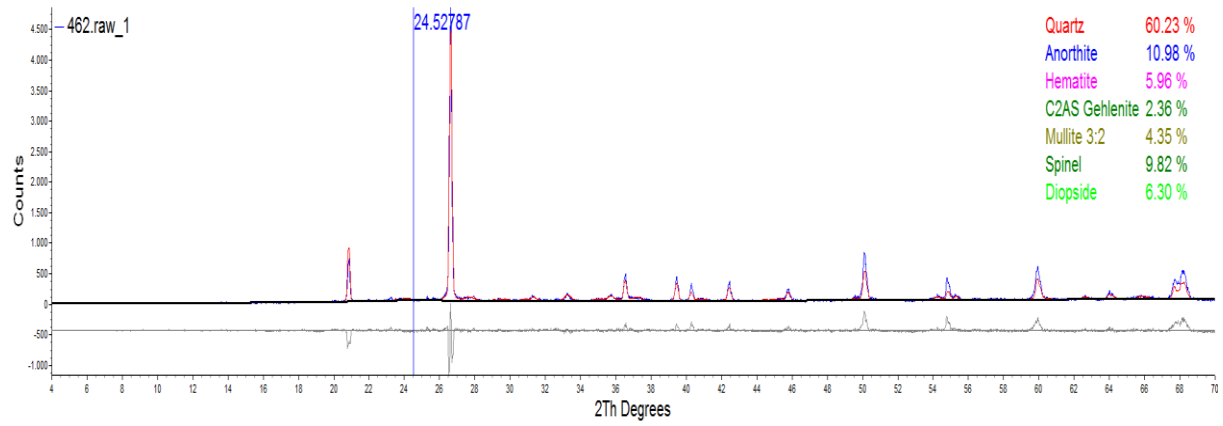
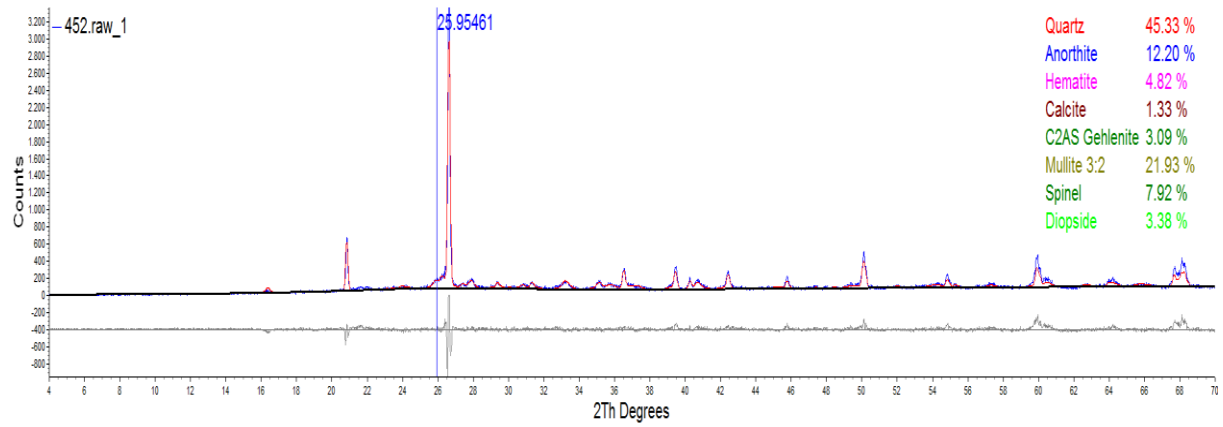
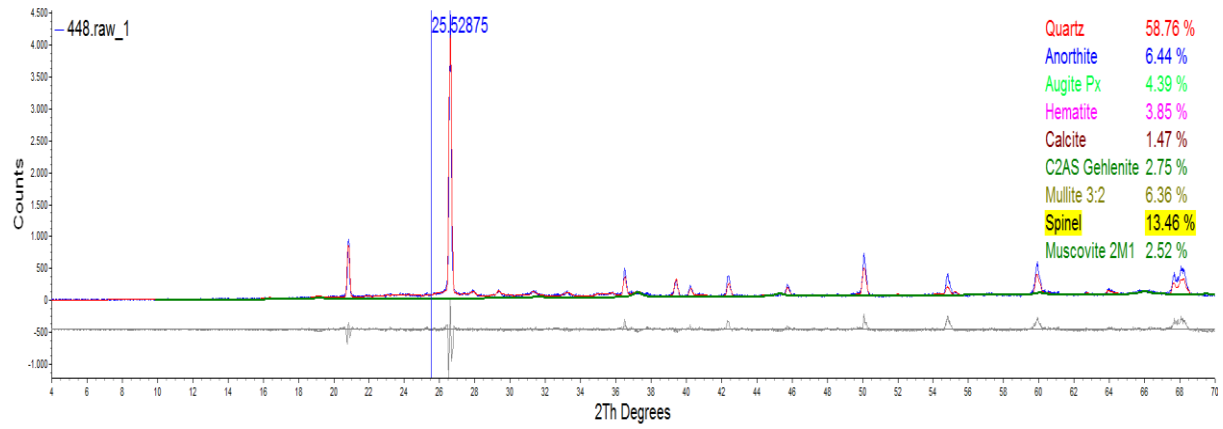


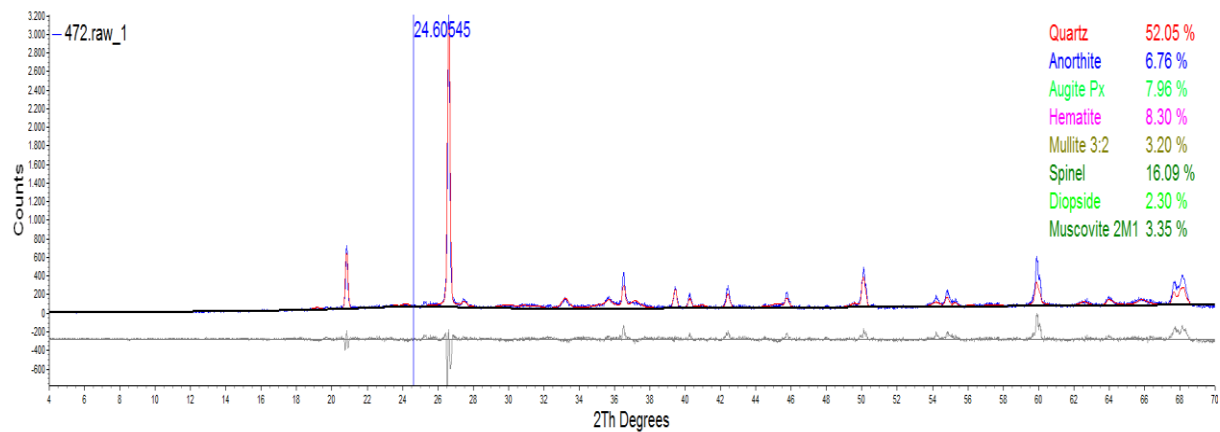
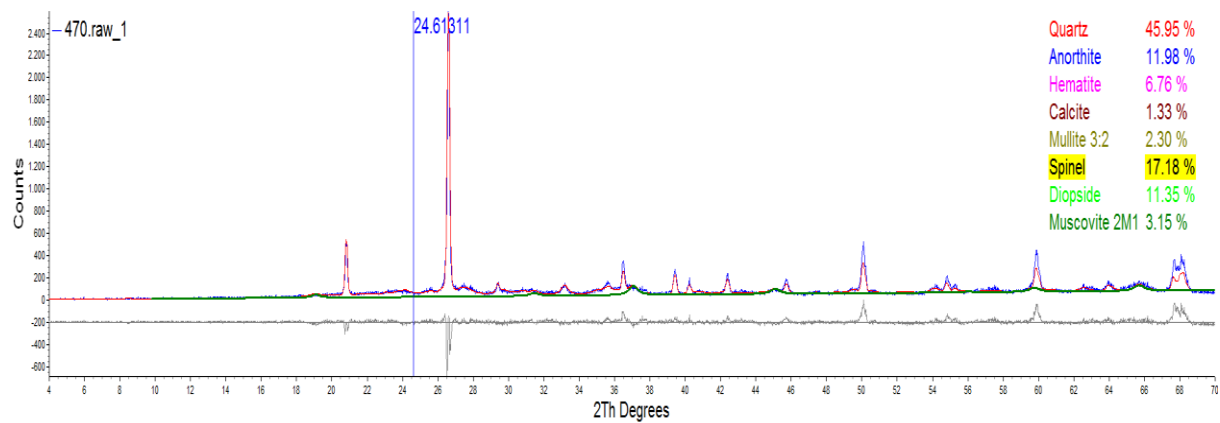
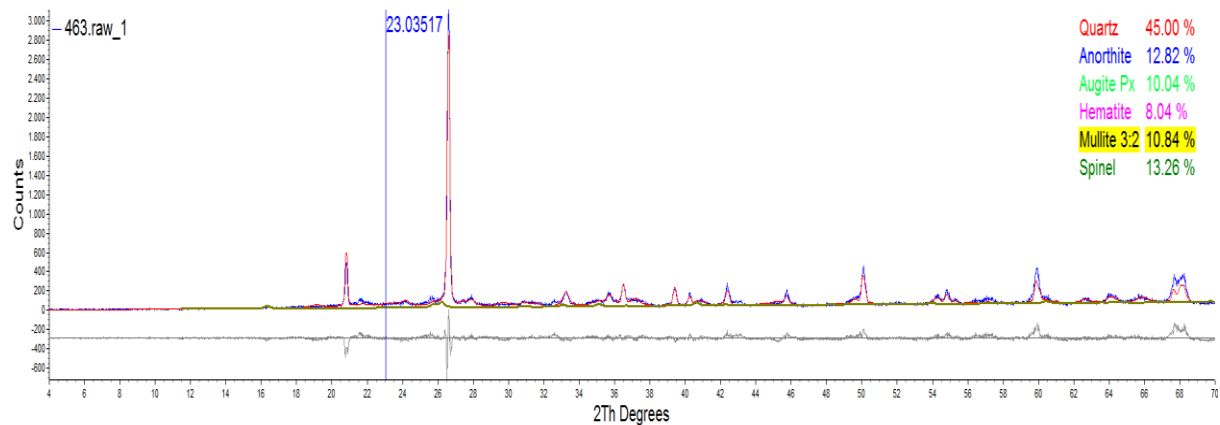


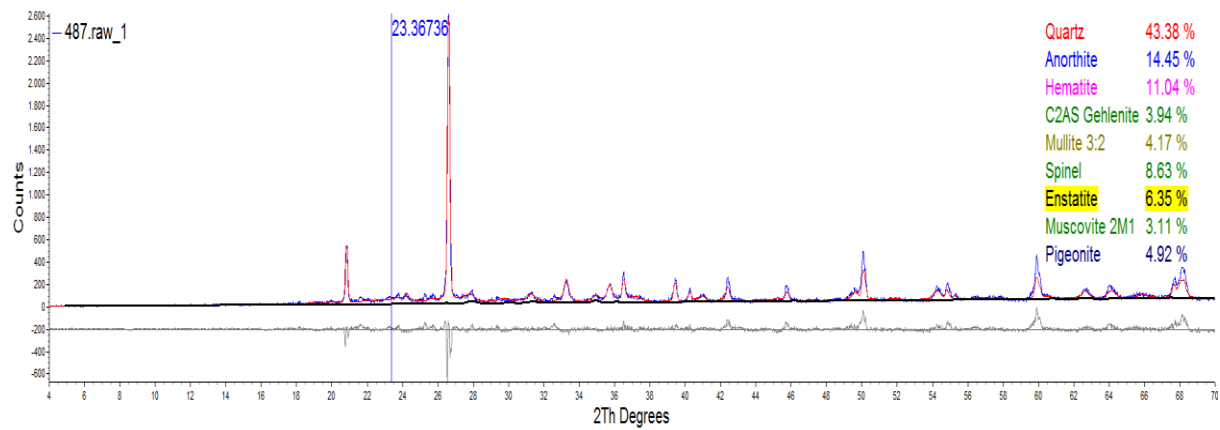
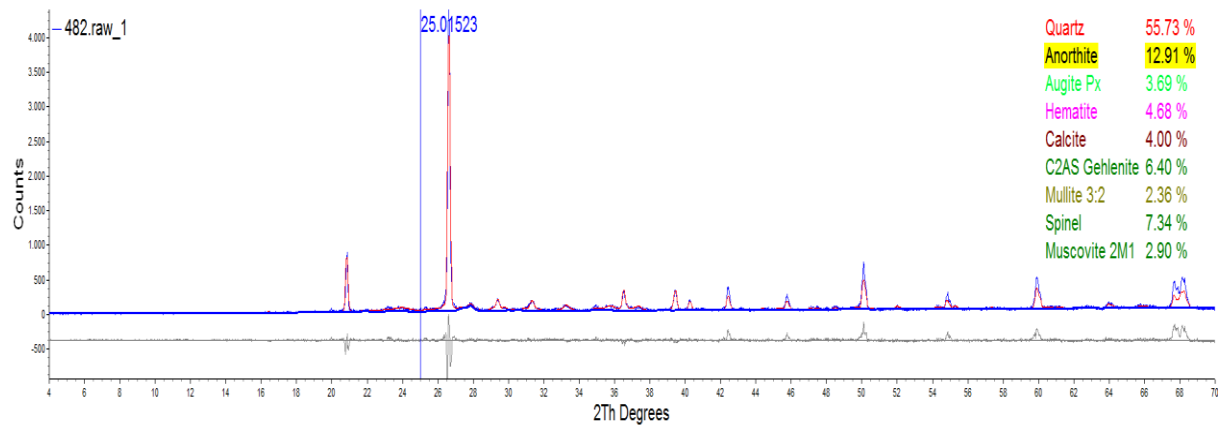
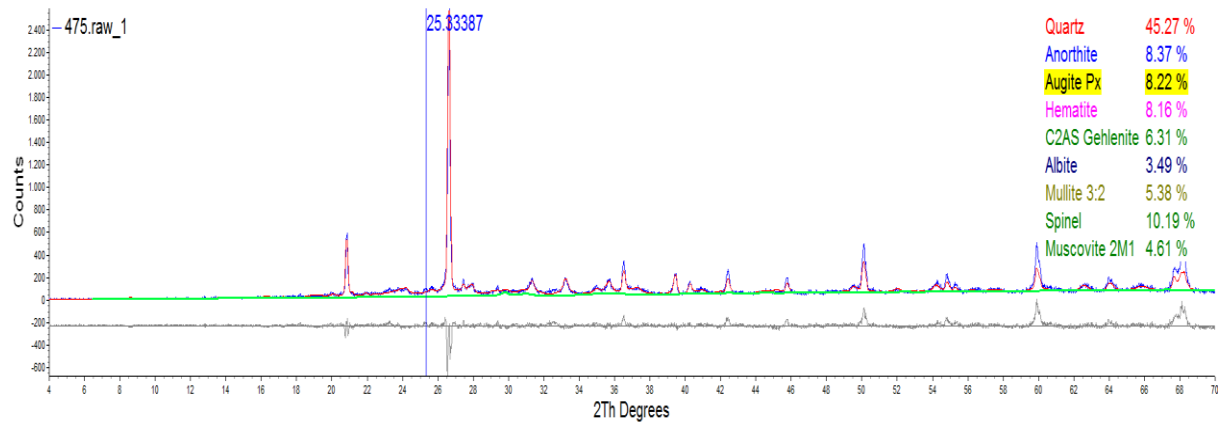


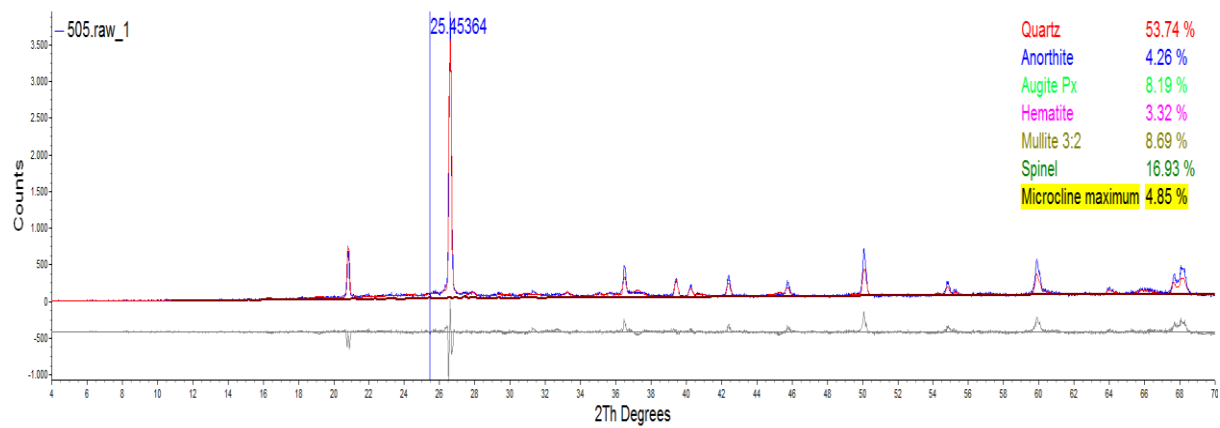
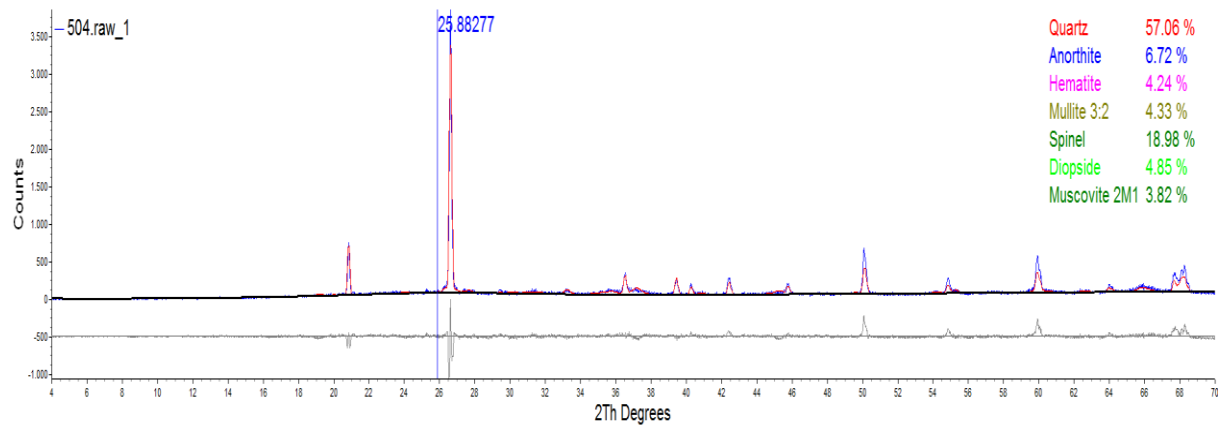
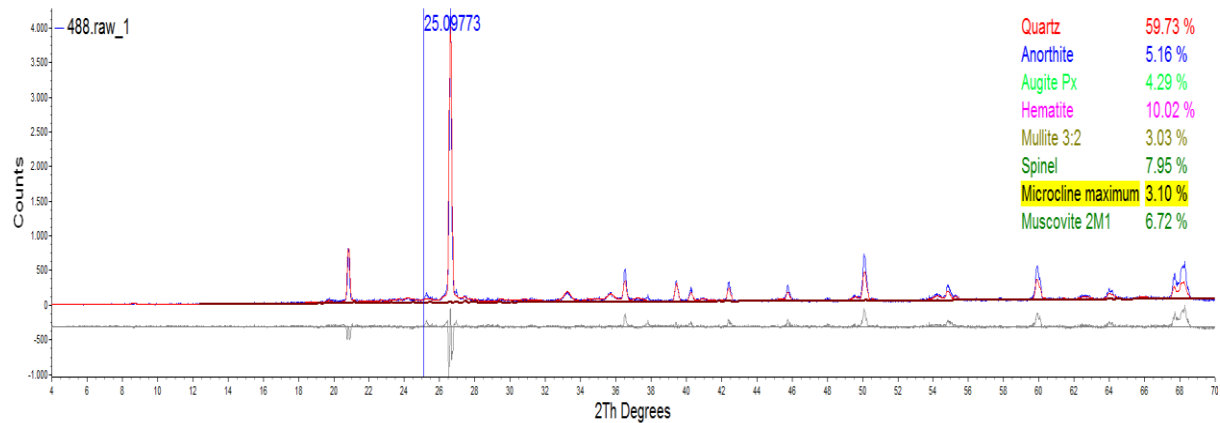


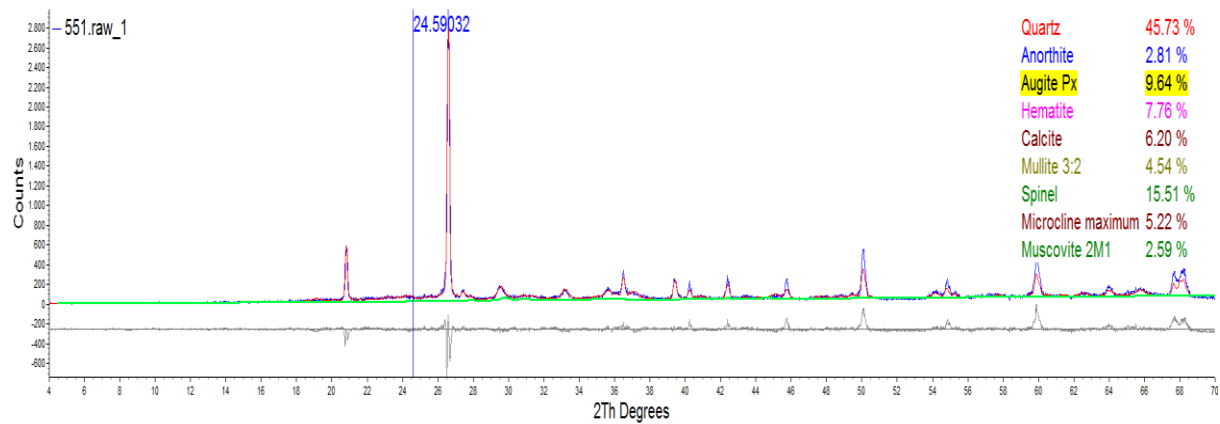
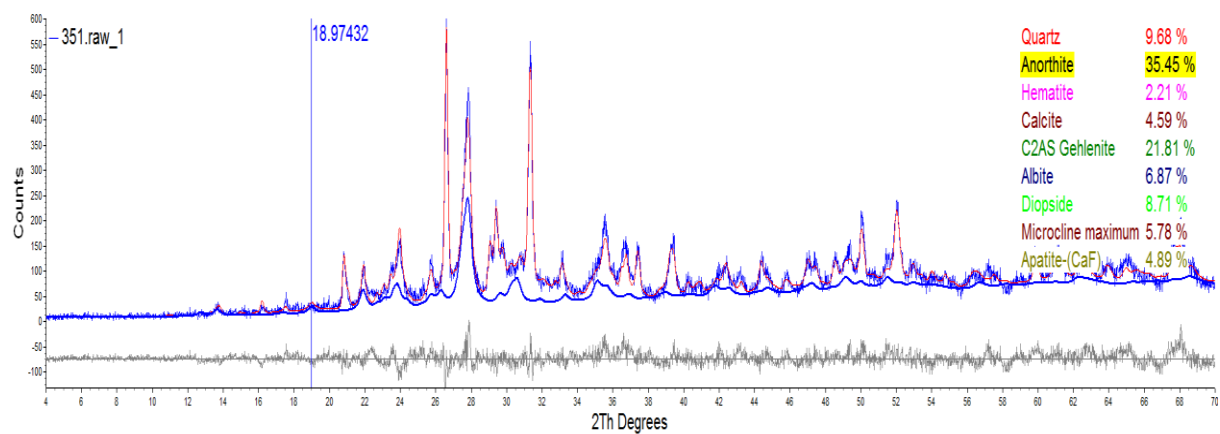
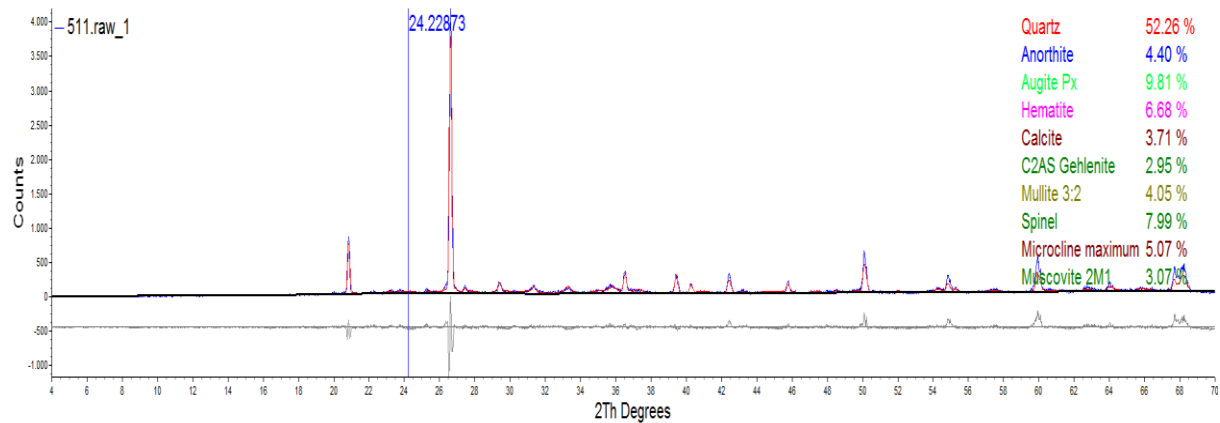


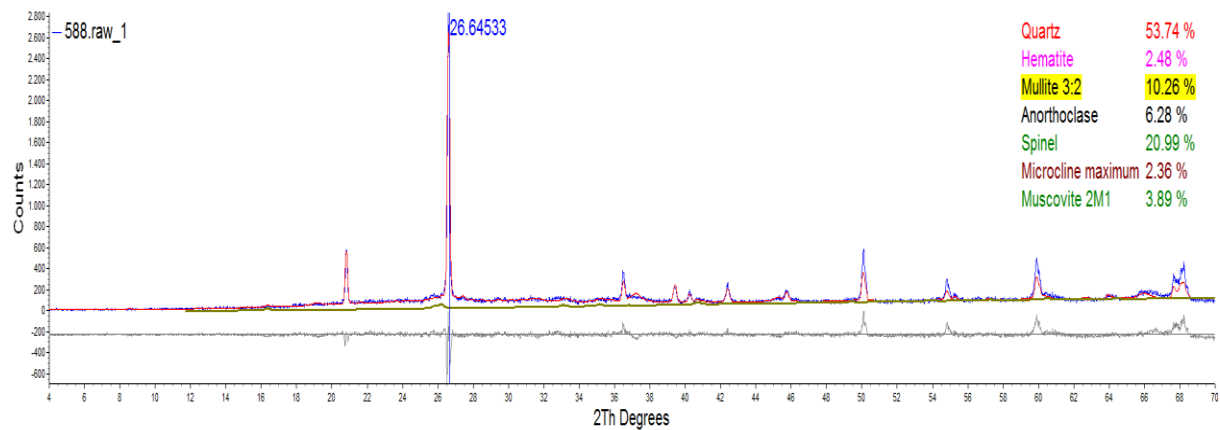
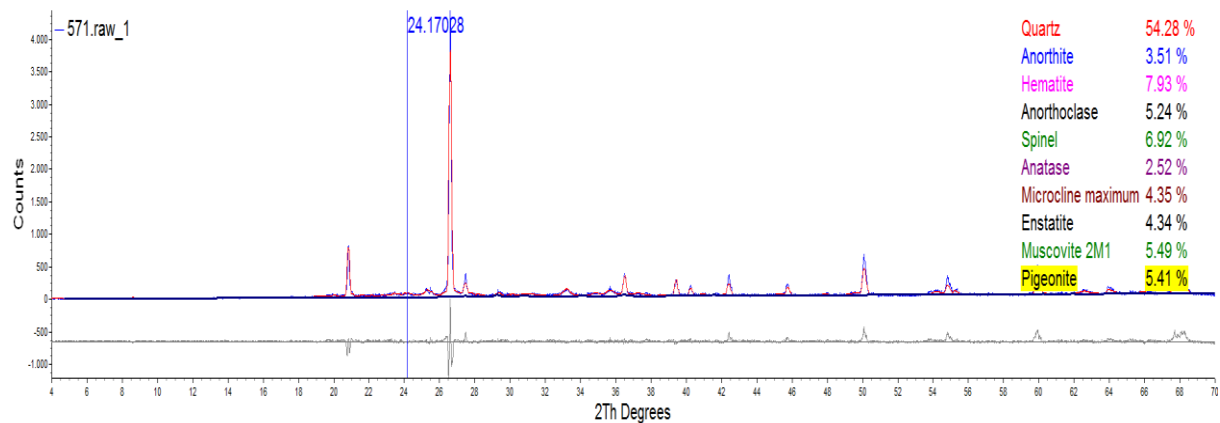
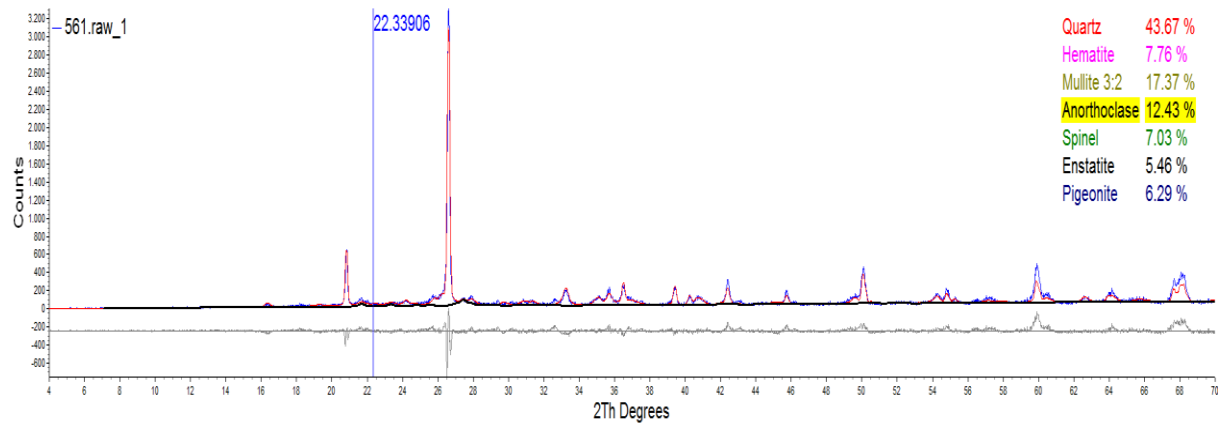


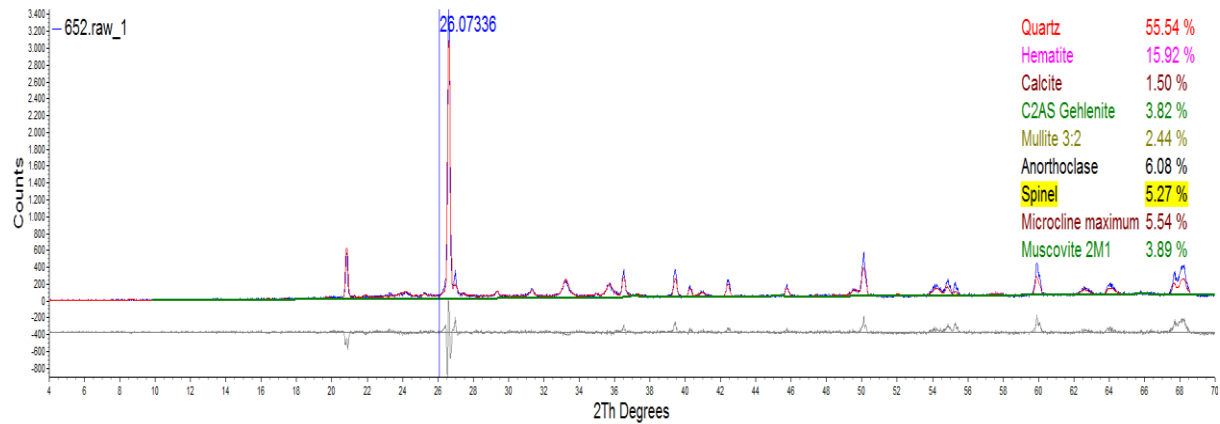
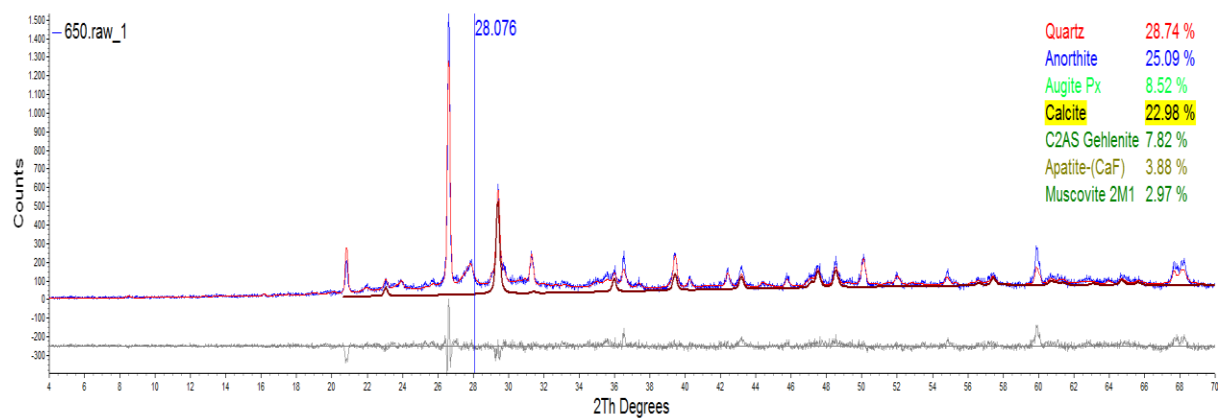
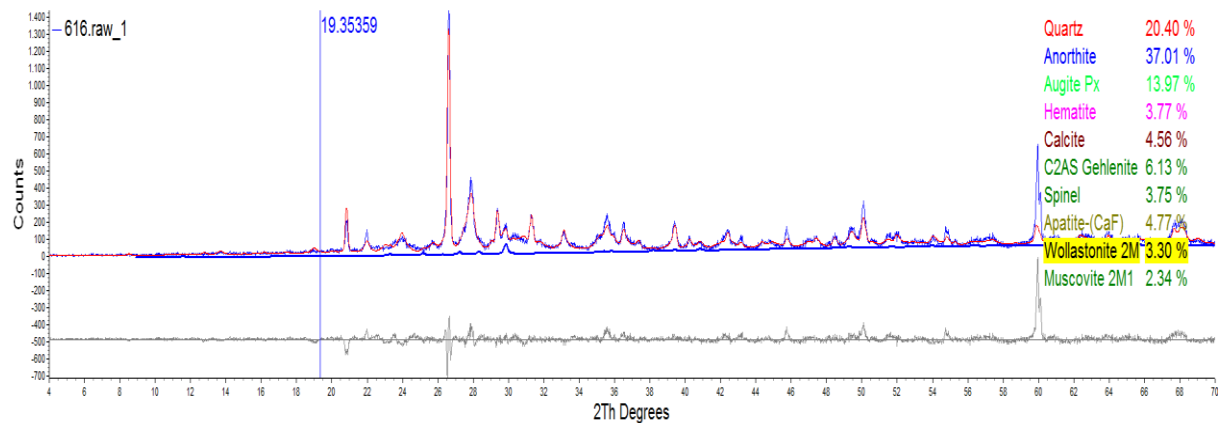


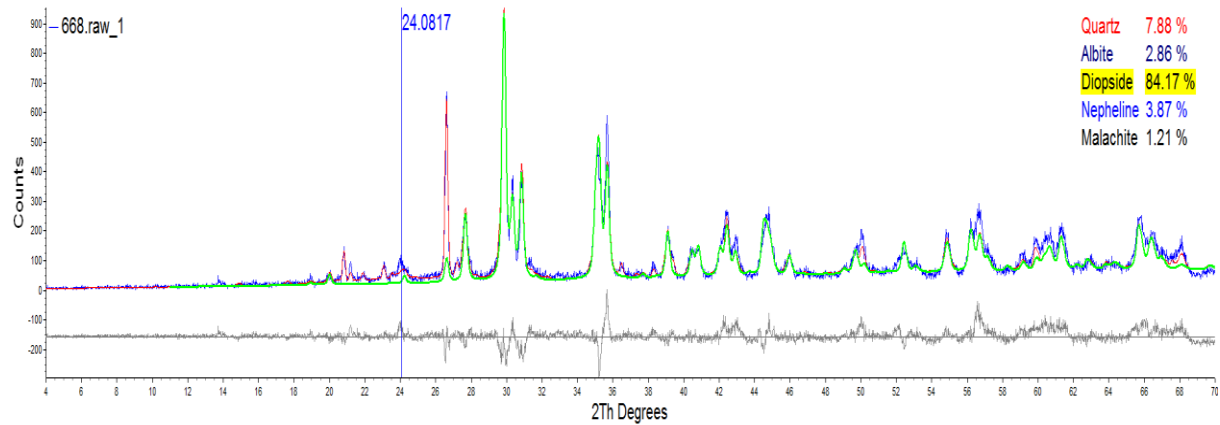
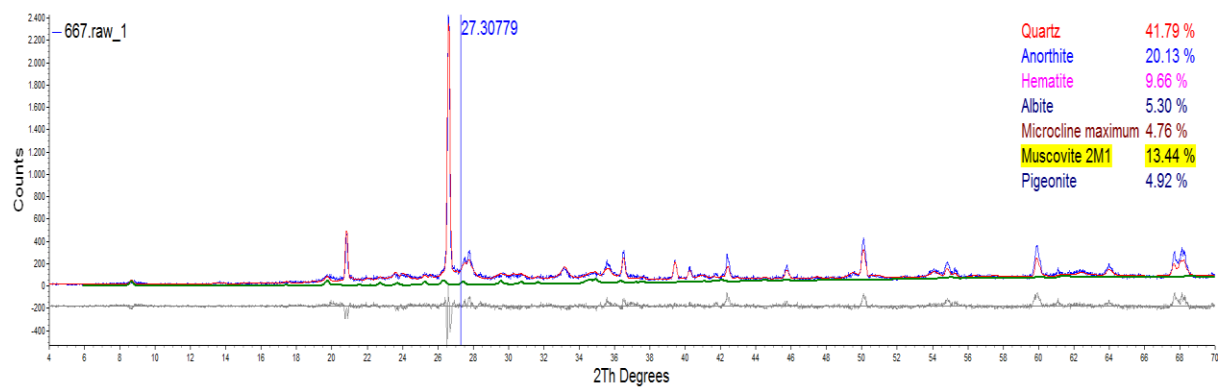
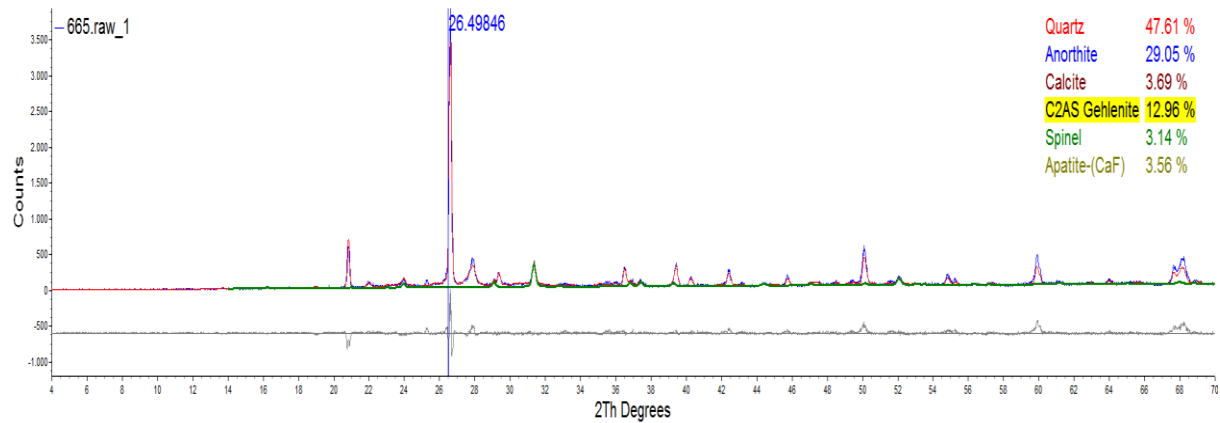


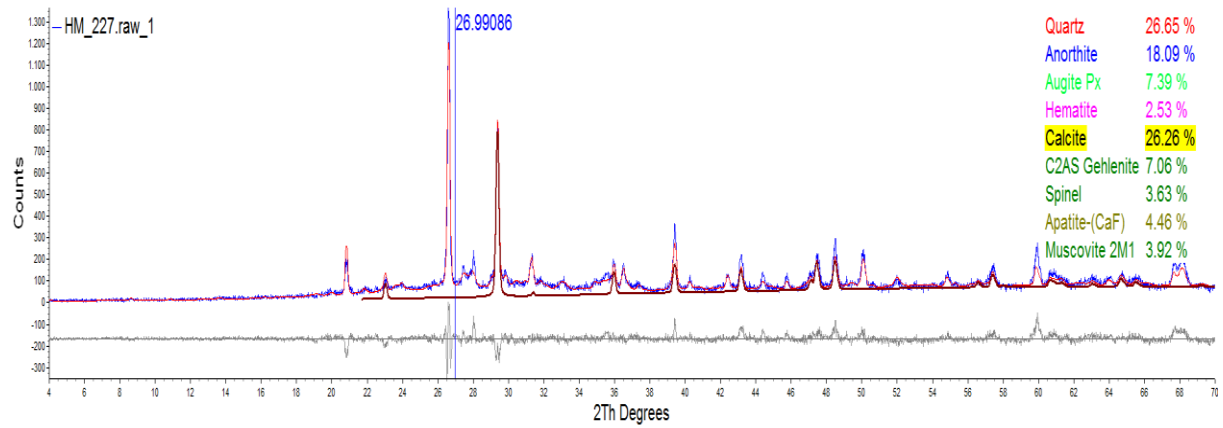
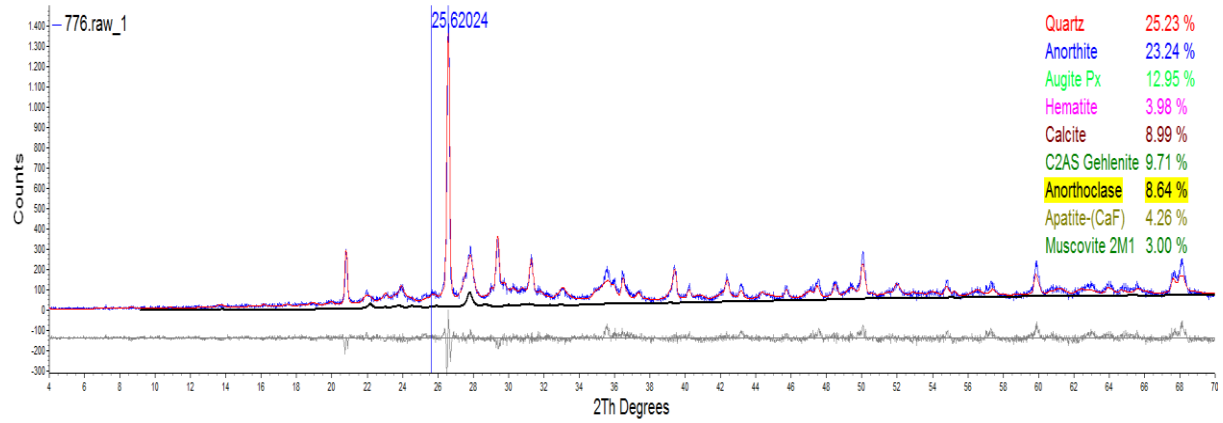
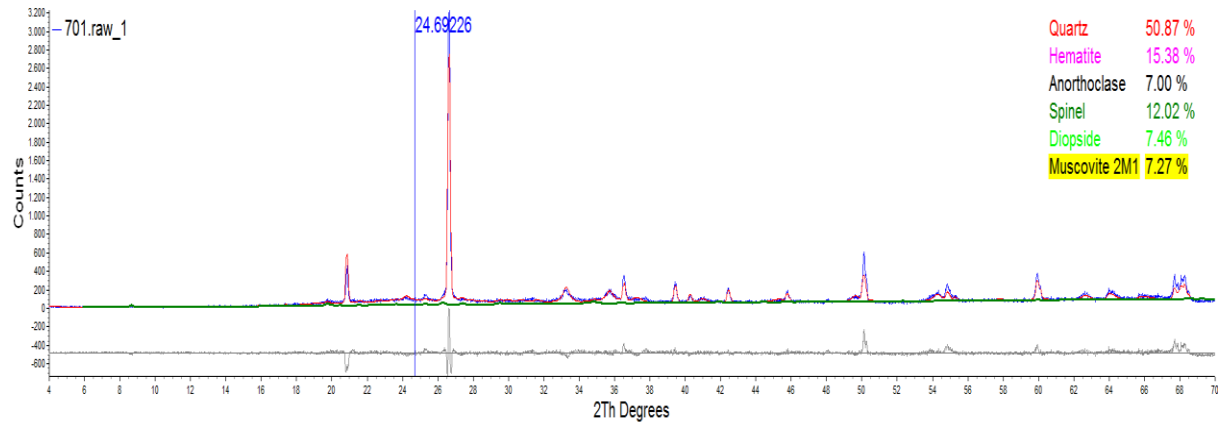


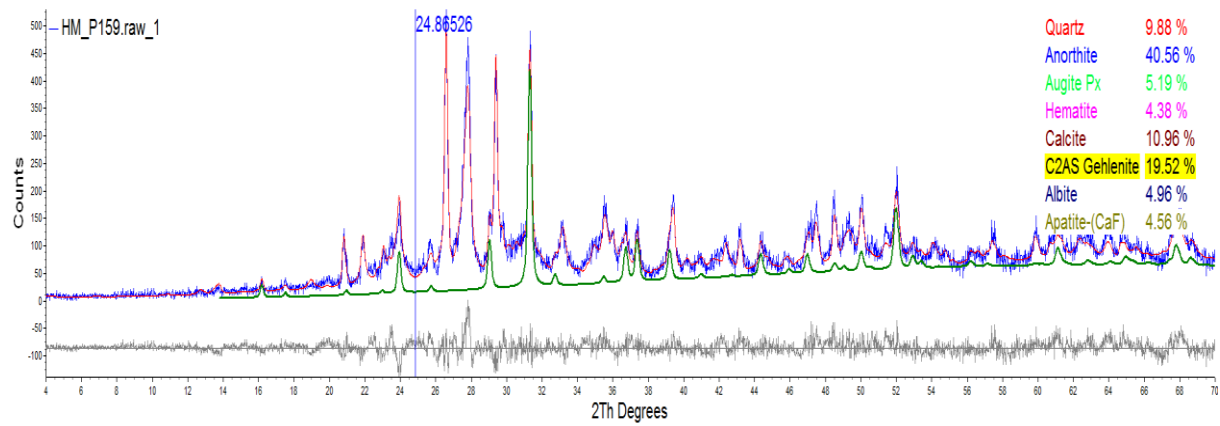
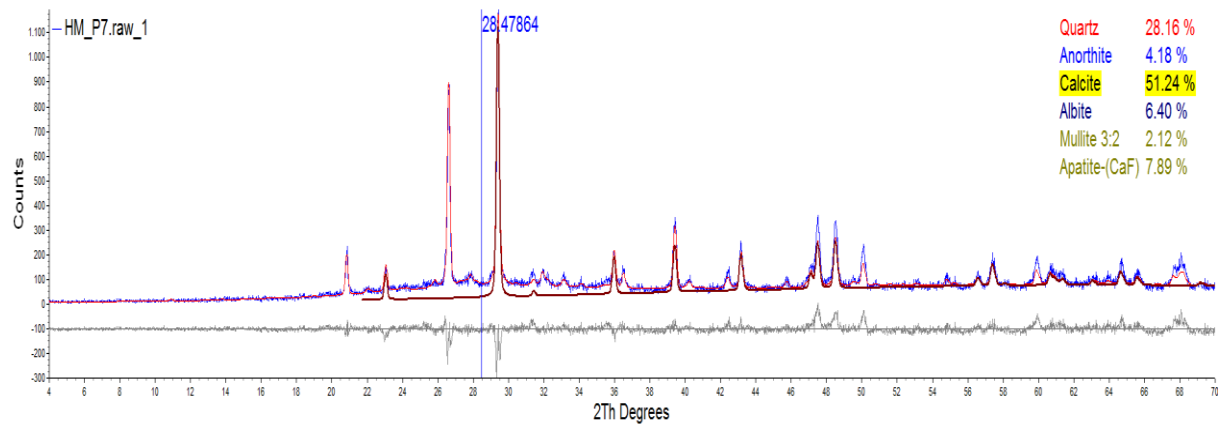
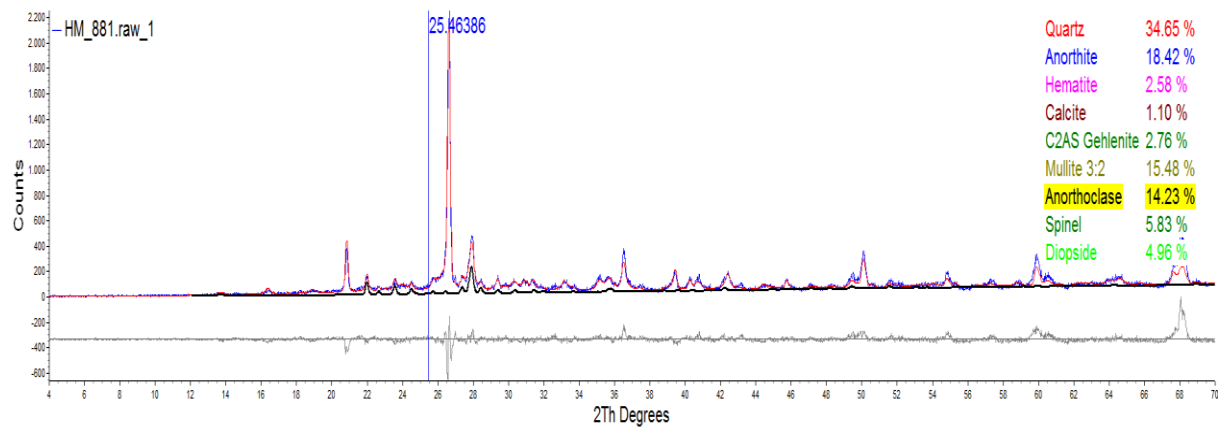


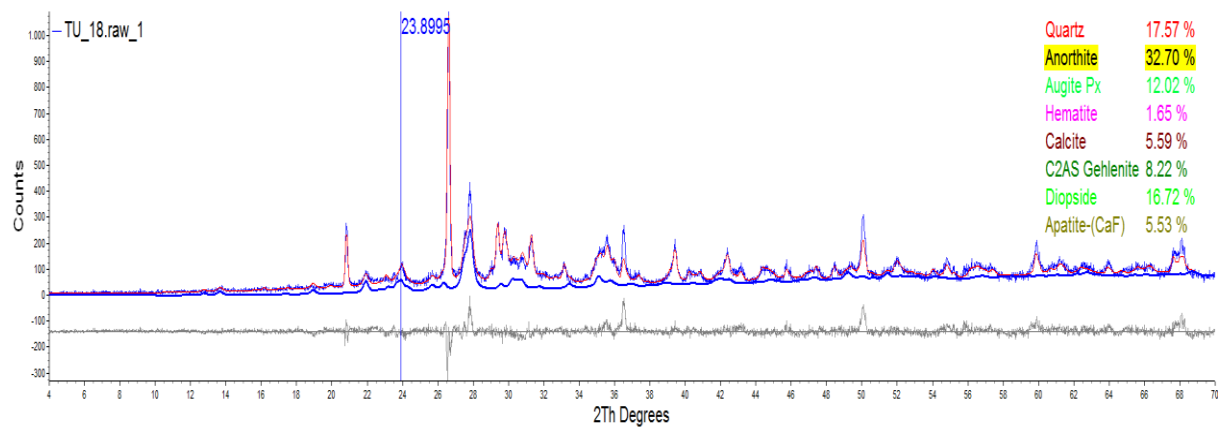
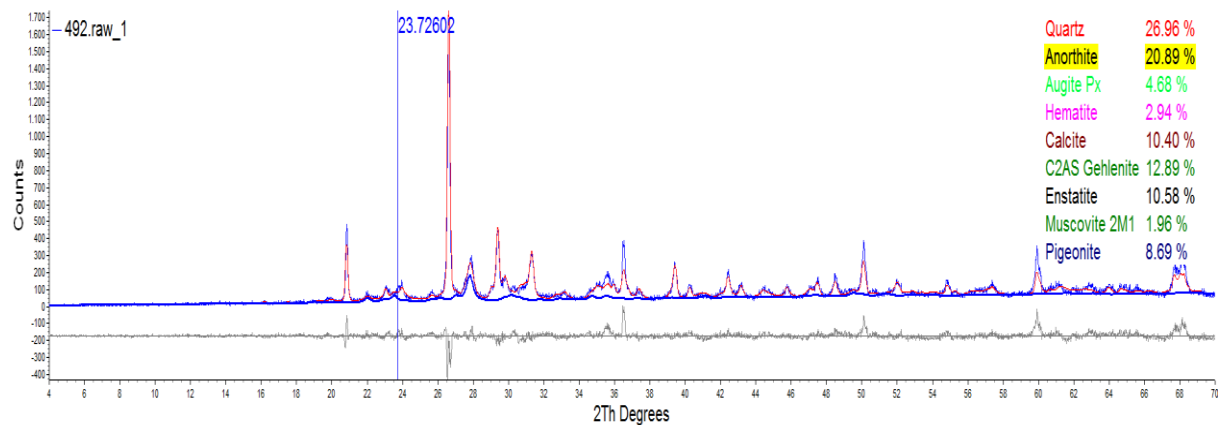




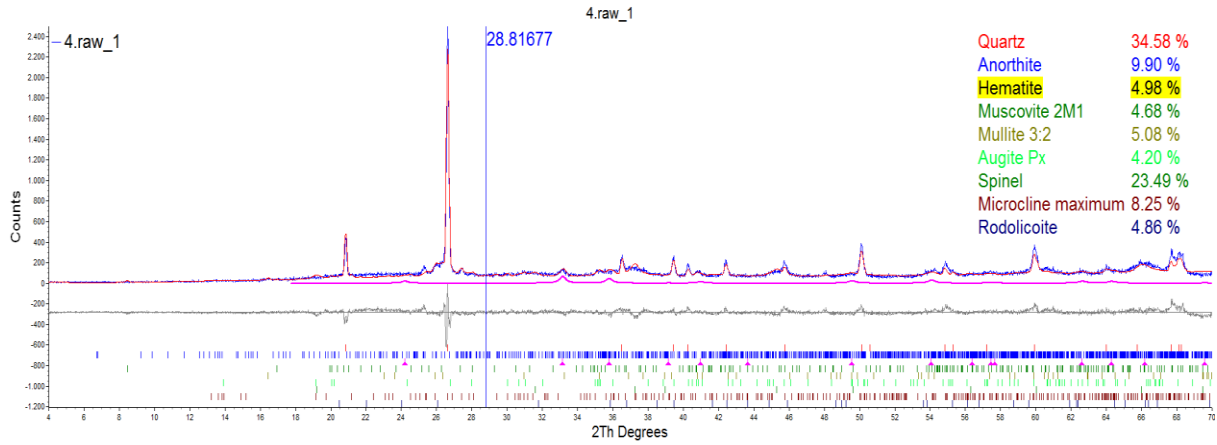




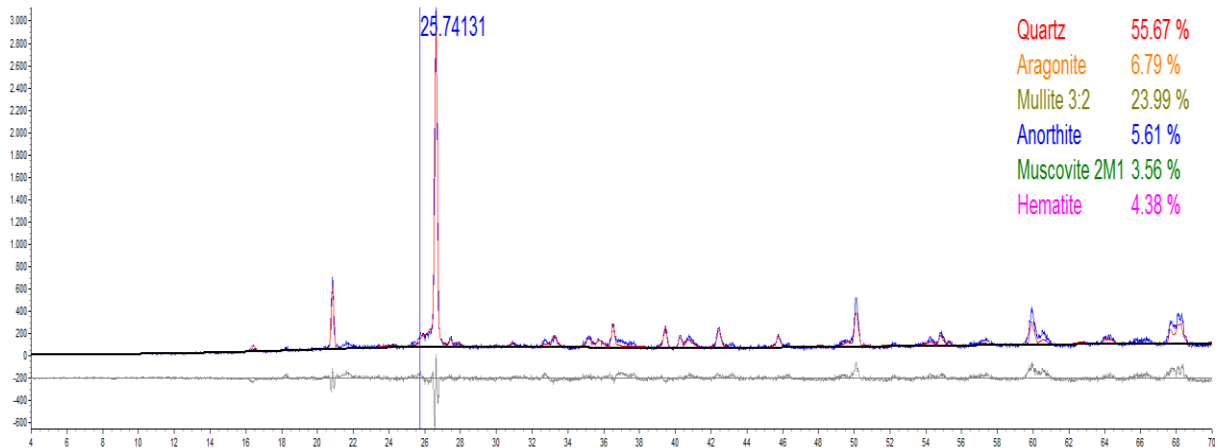




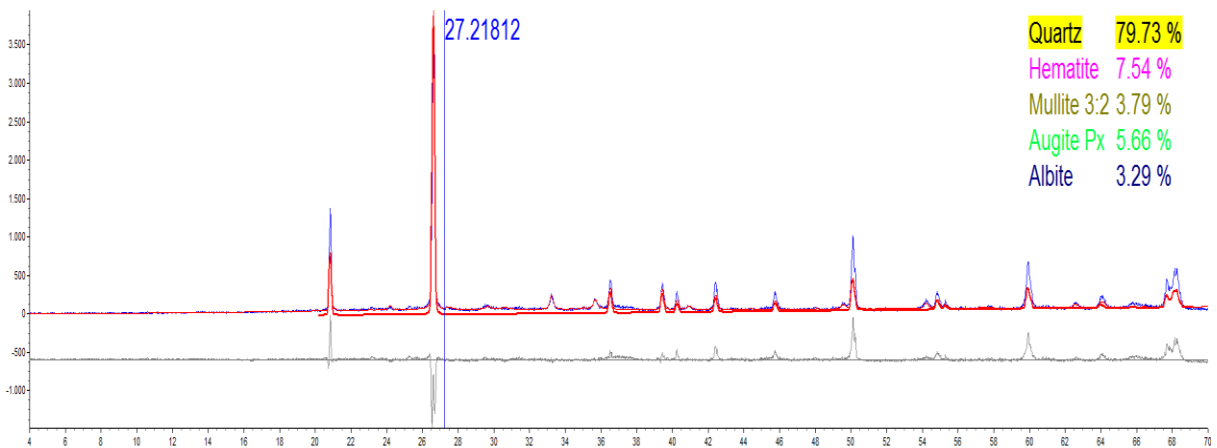
I.2: Gadara diffractograms



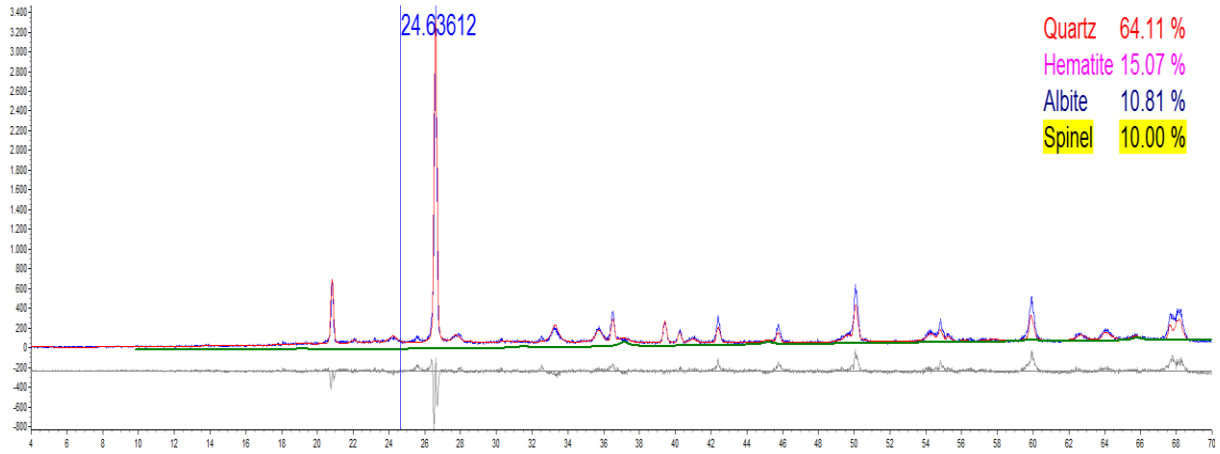
Sample 4



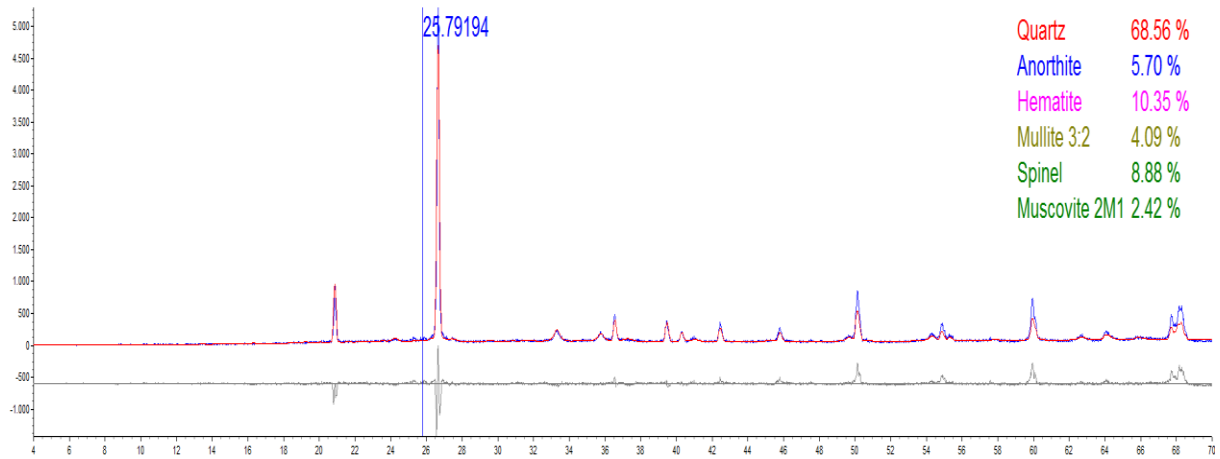
Sample 7



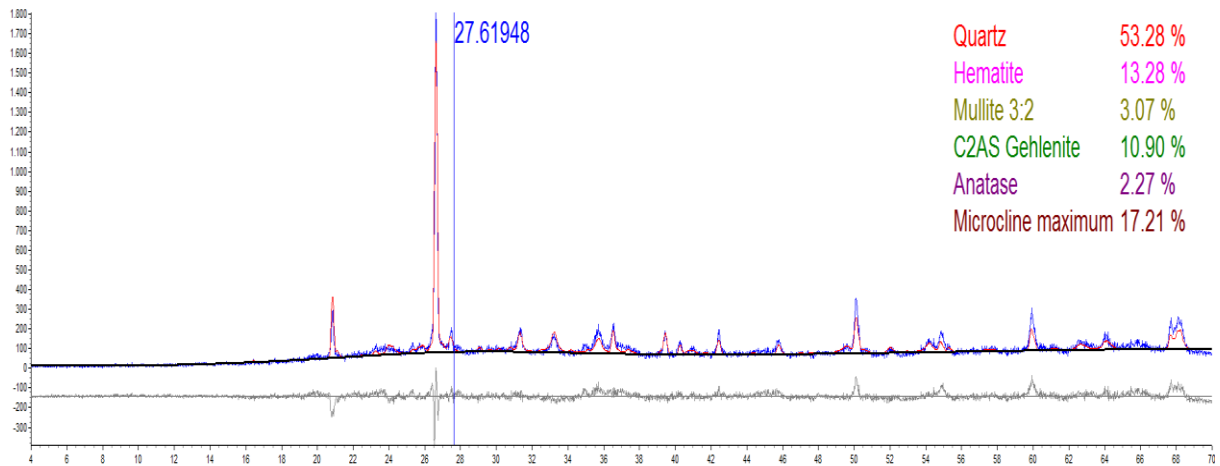
Sample 12



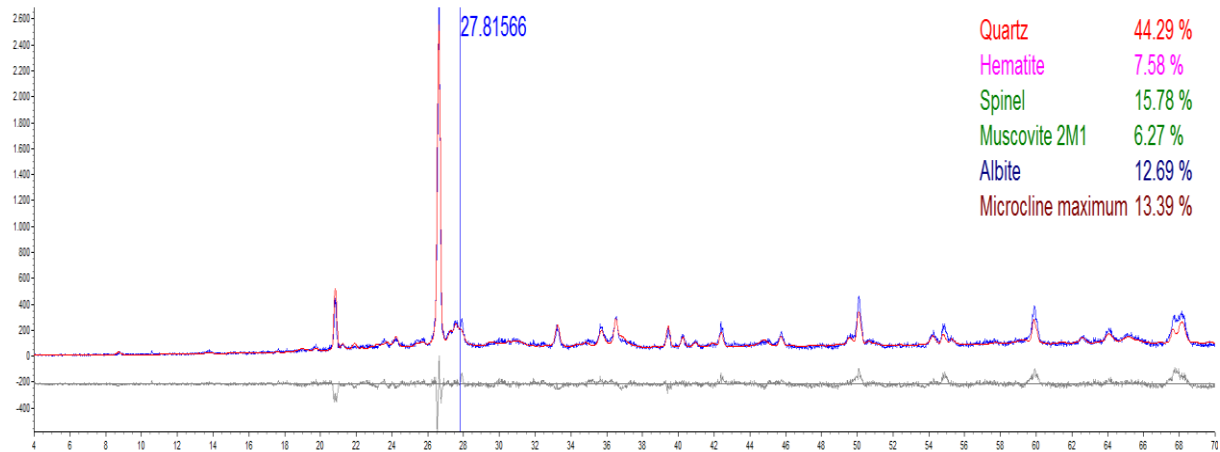
Sample 13



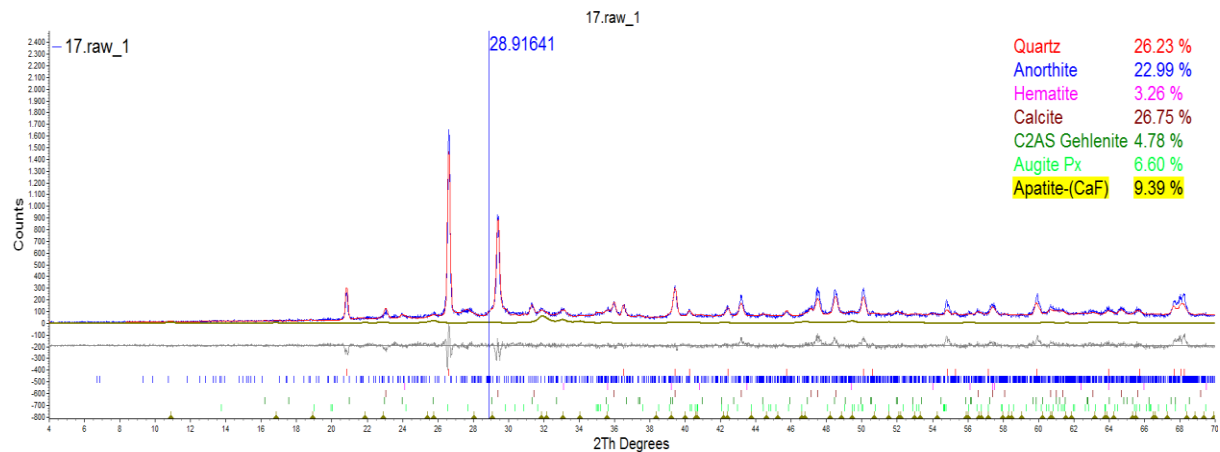
Sample 14



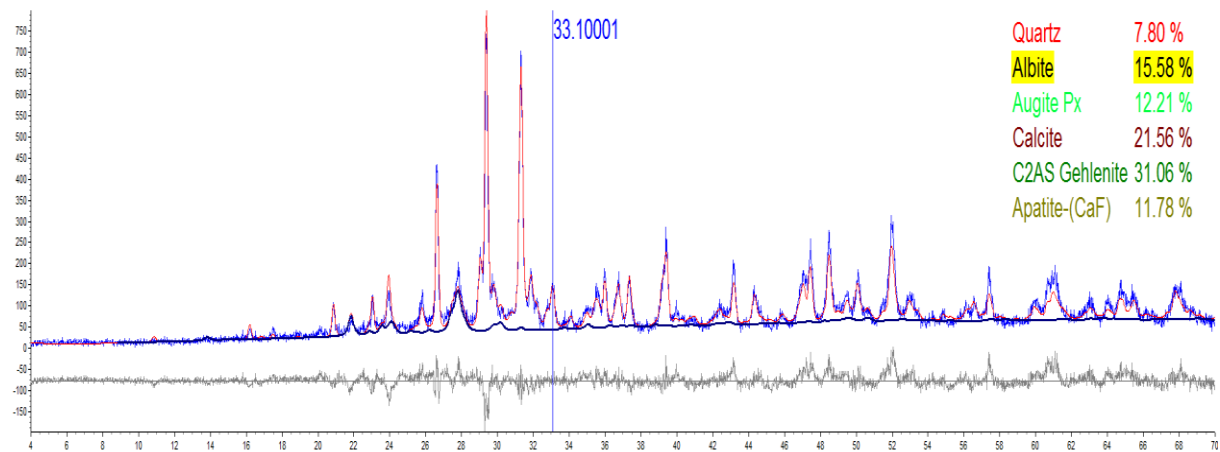
Sample 15



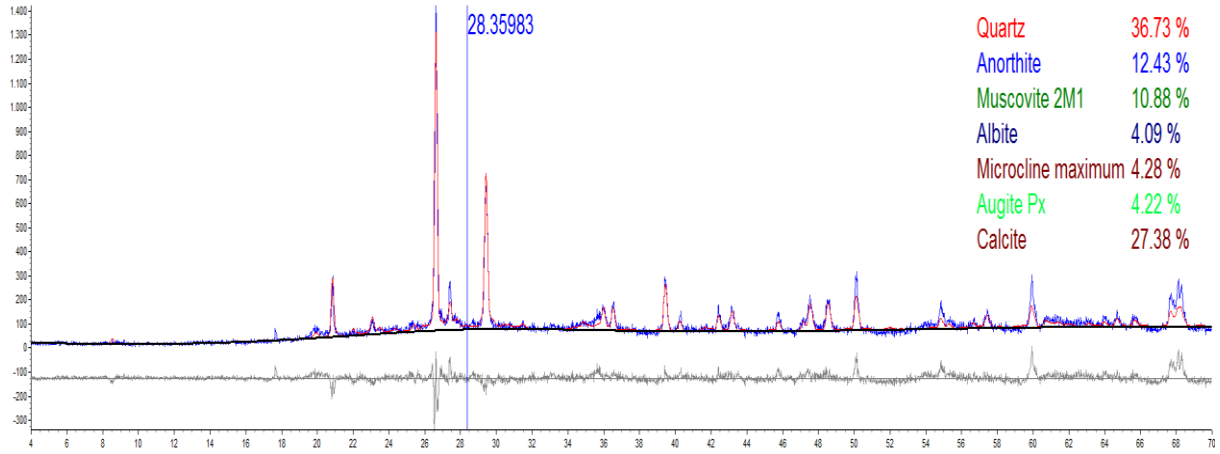
Sample 16



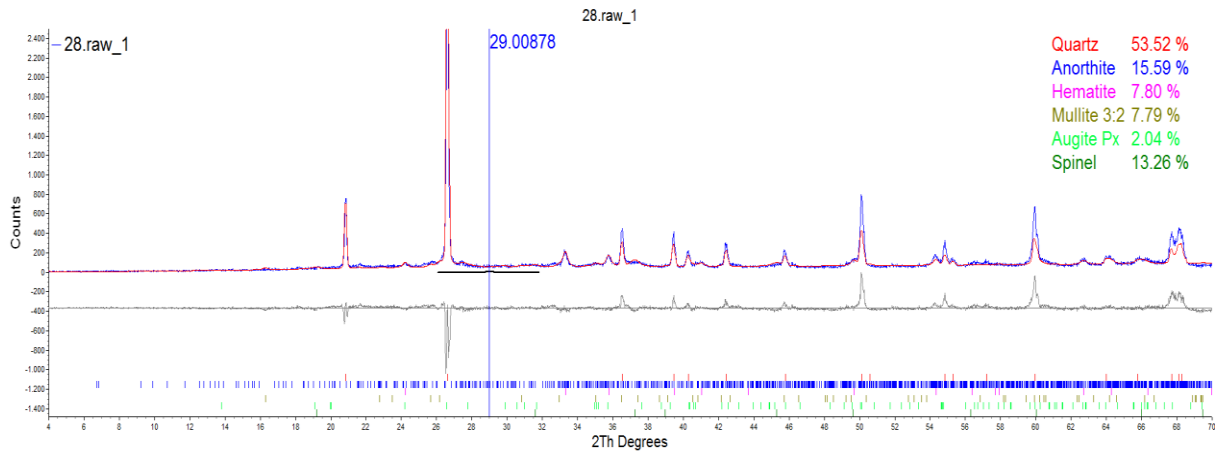
Sample 17



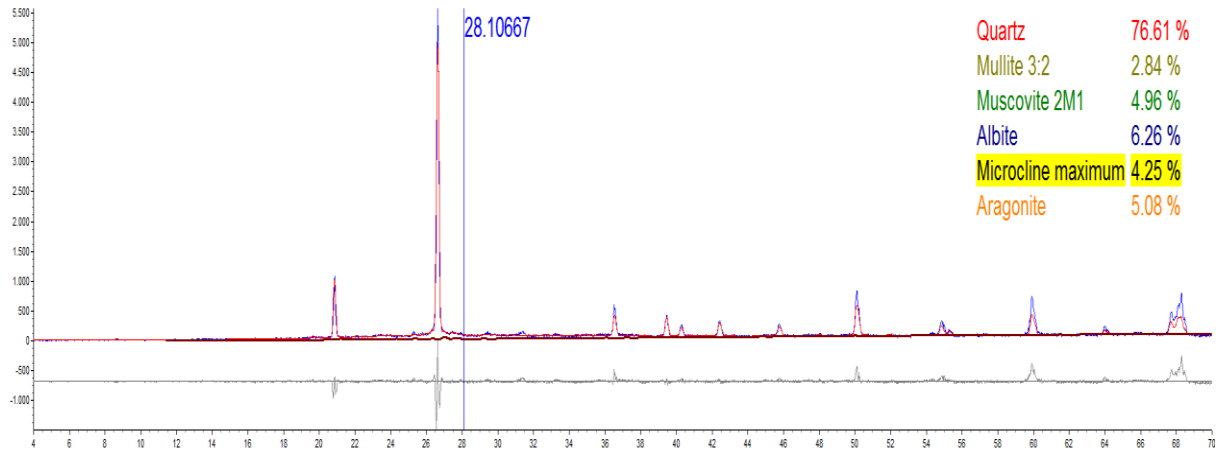
Sample 20



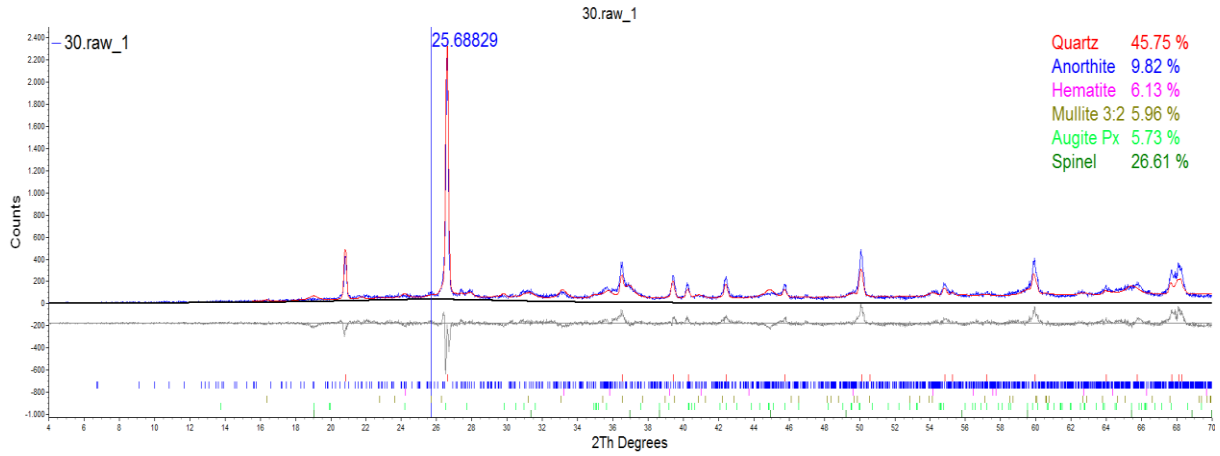
Sample 27



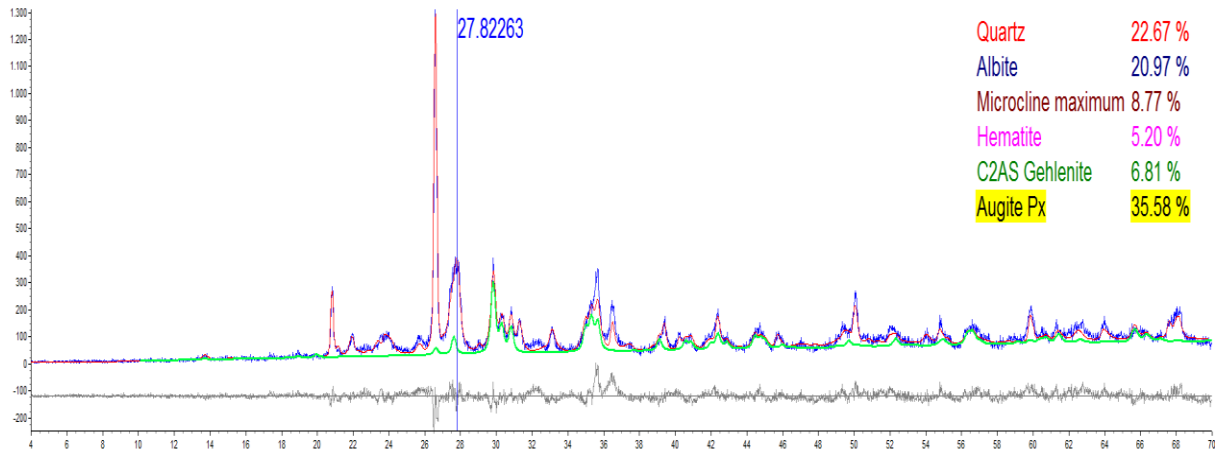
Sample 28



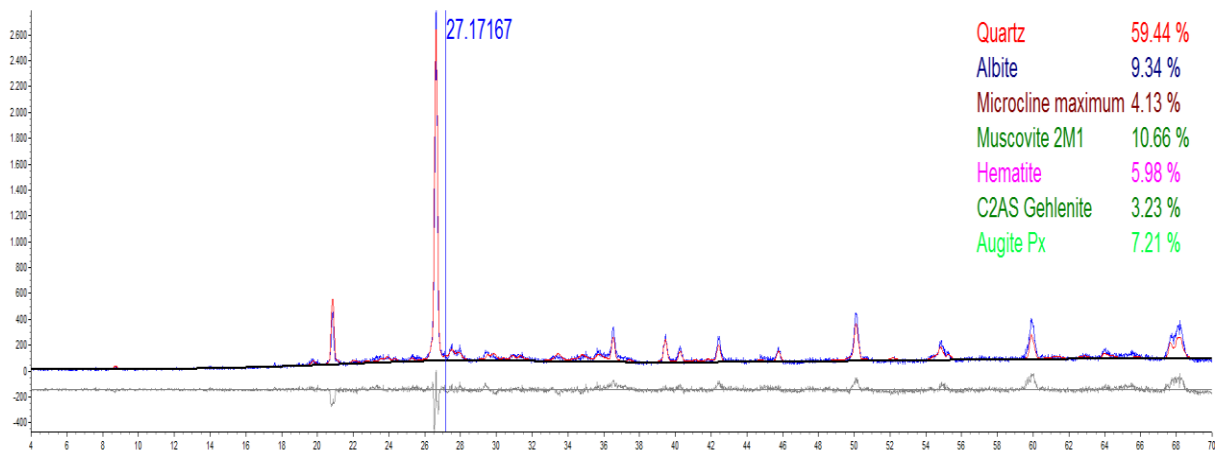
Sample 29



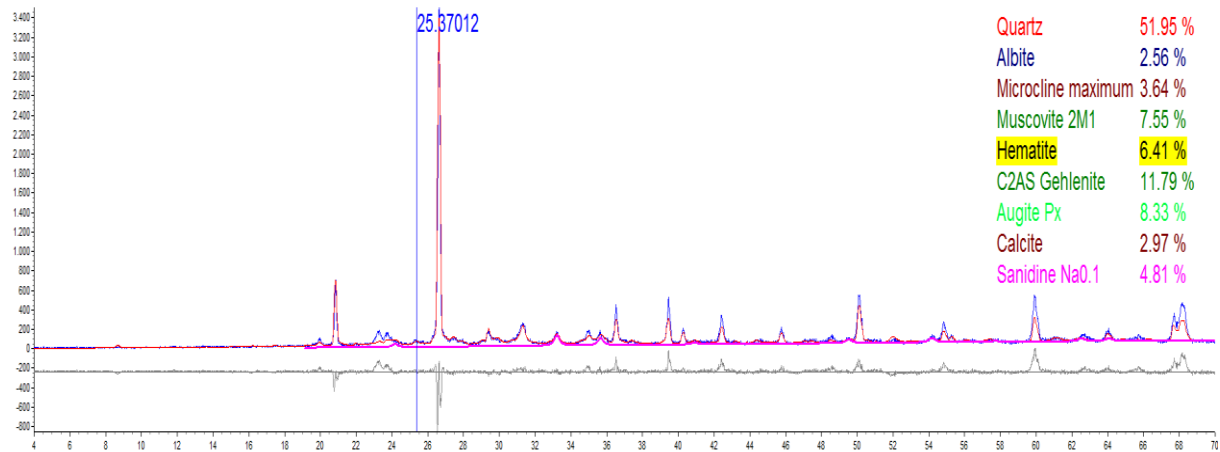
Sample 30



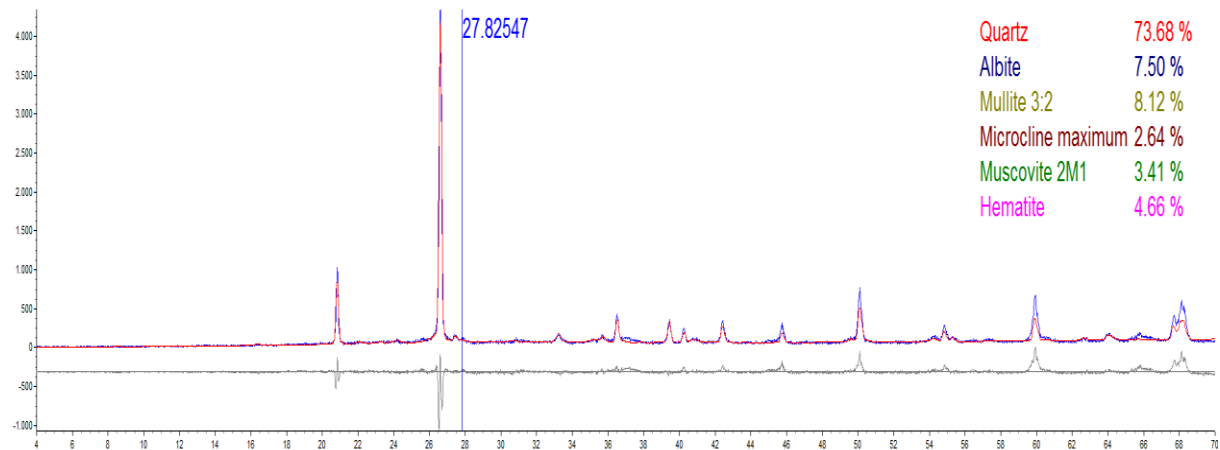
Sample 31



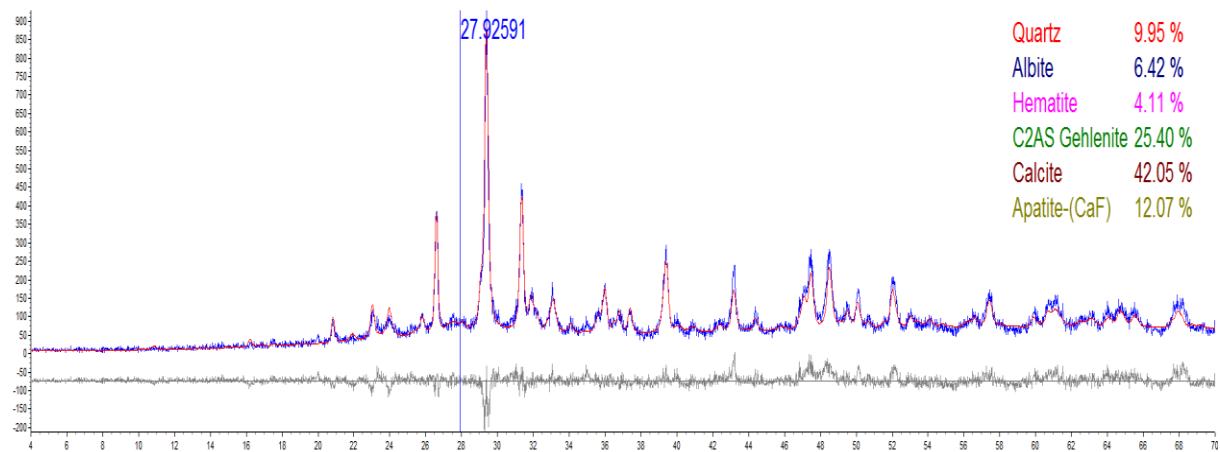
Sample 34



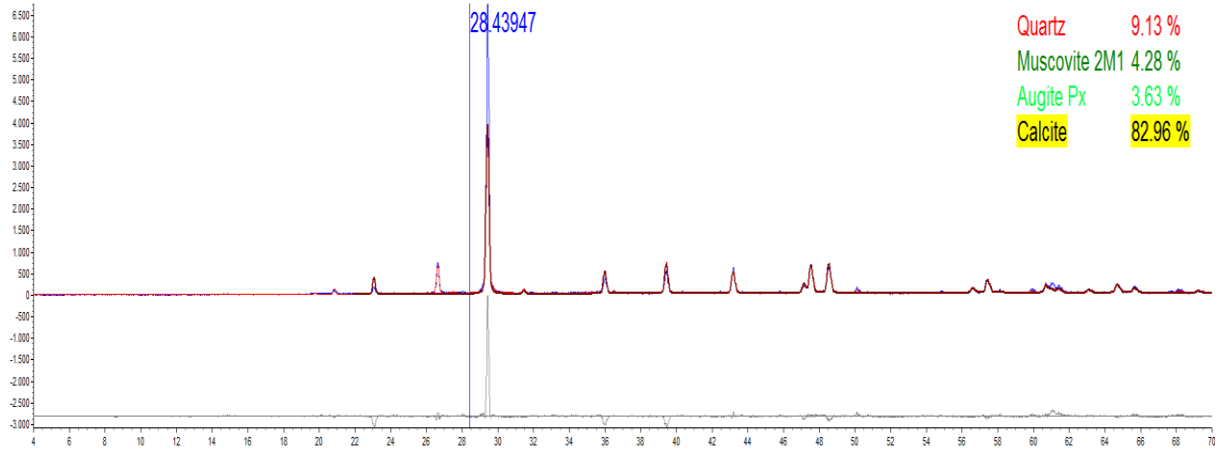
Sample 44



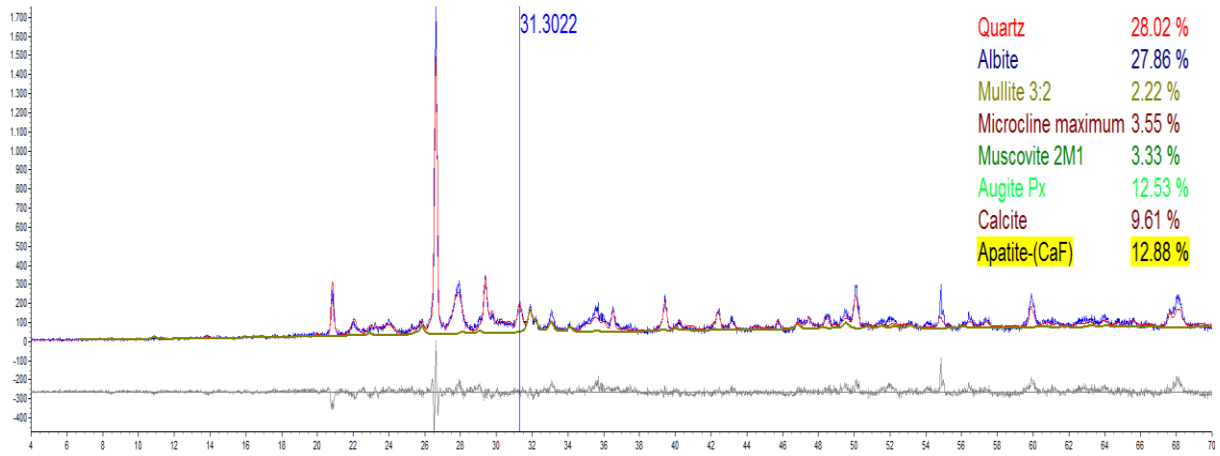
Sample45



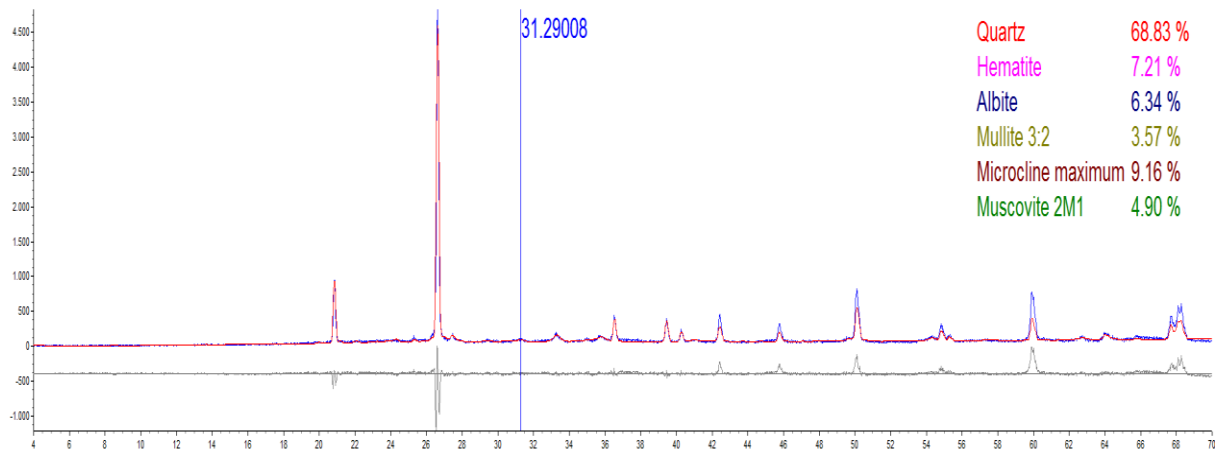
Sample 61



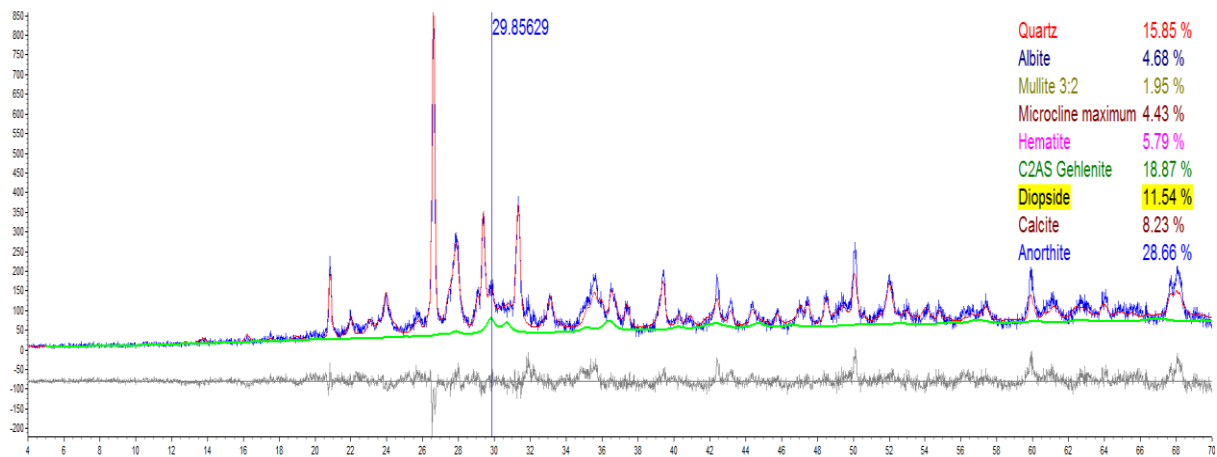
Sample 72



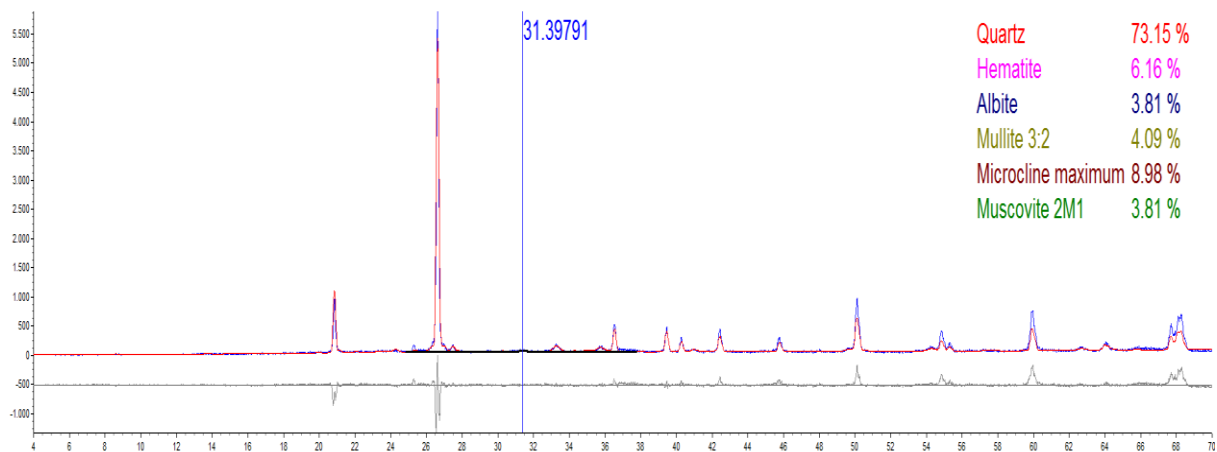
Sample 73



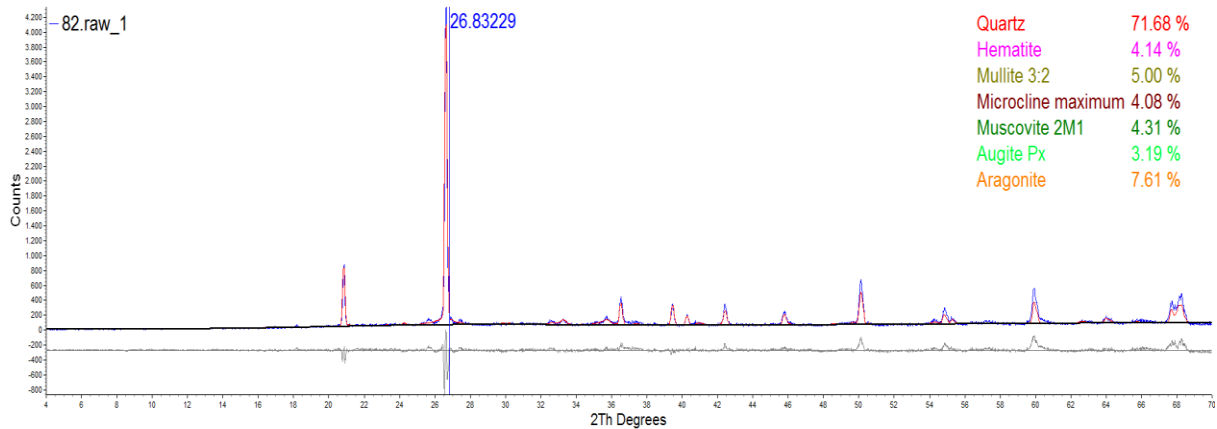
Sample 76



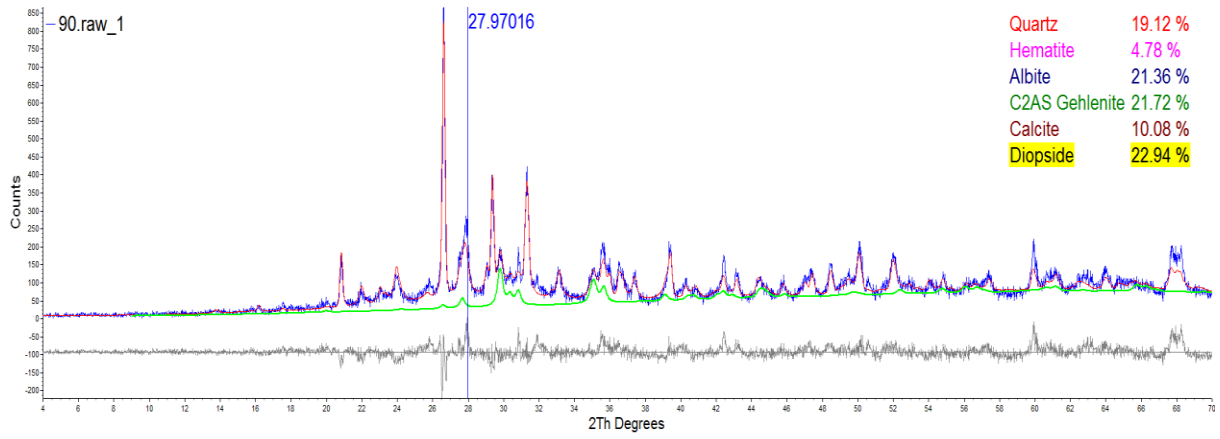
Sample 77



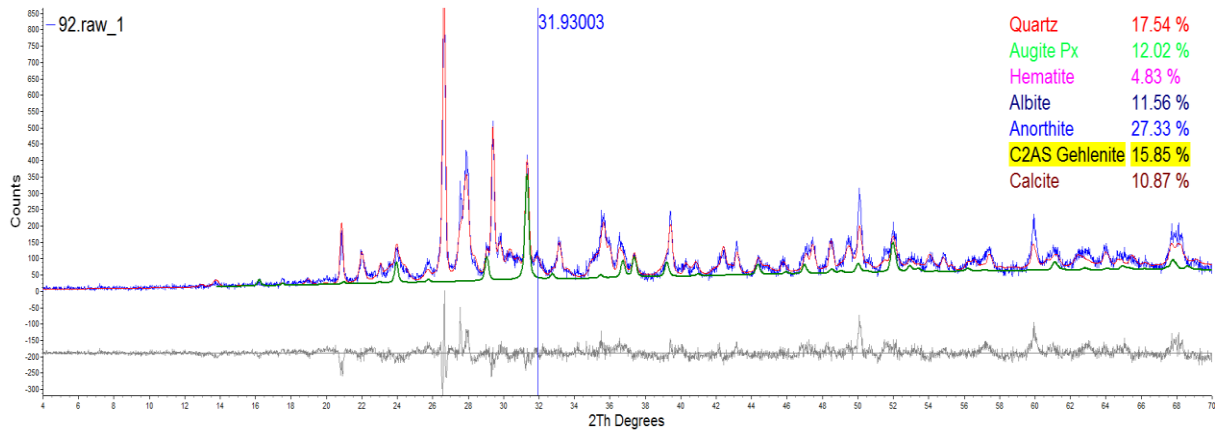
Sample 81



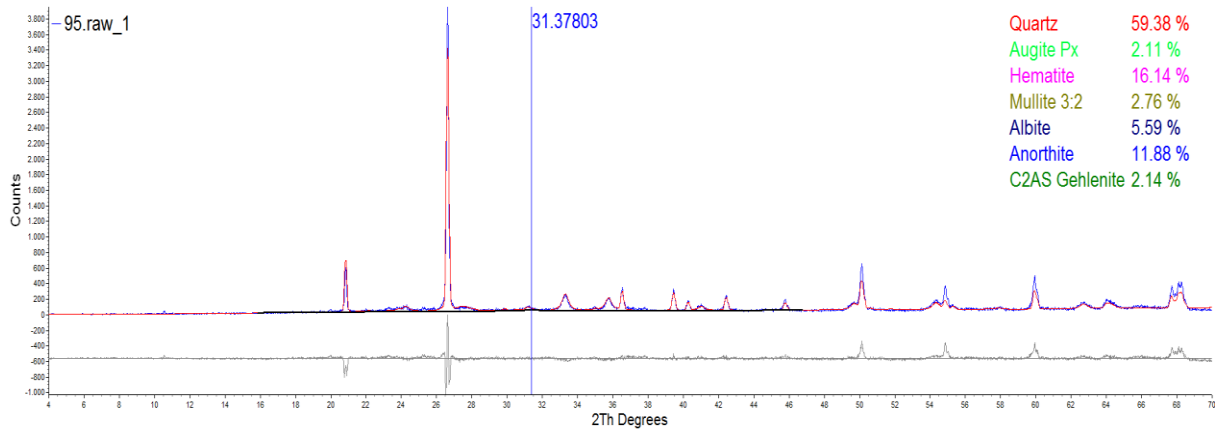
Sample 82



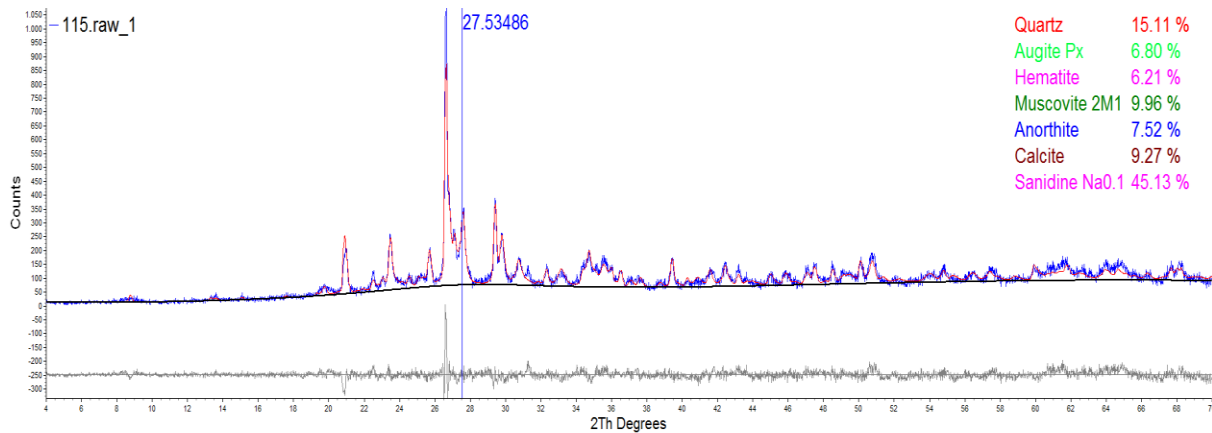
Sample 90



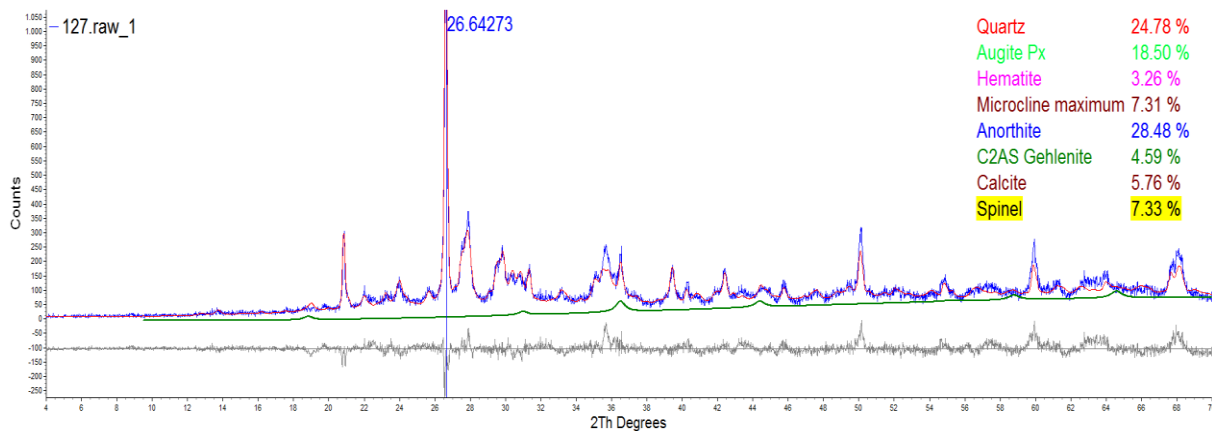
Sample 92



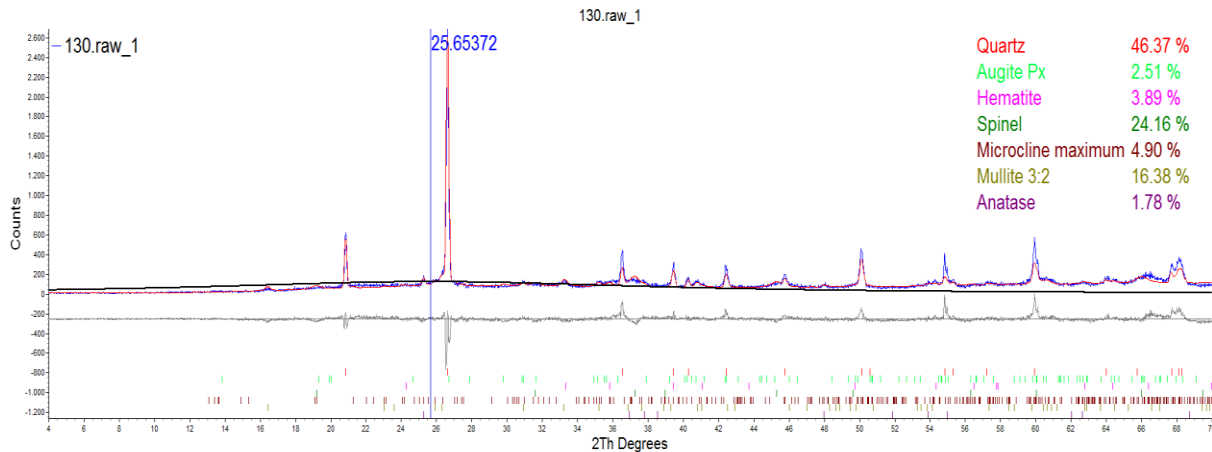
Sample 95



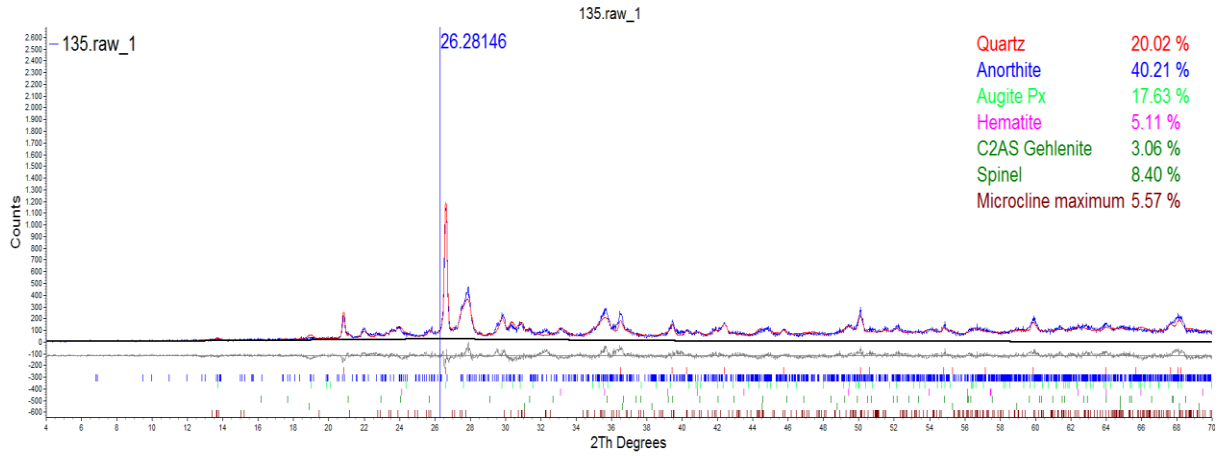
Sample 115



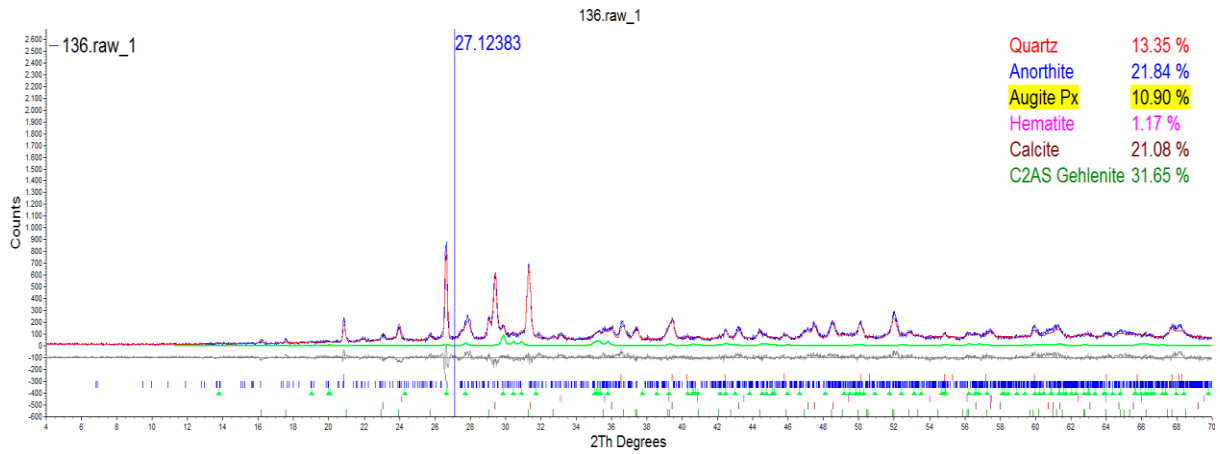
Sample 127



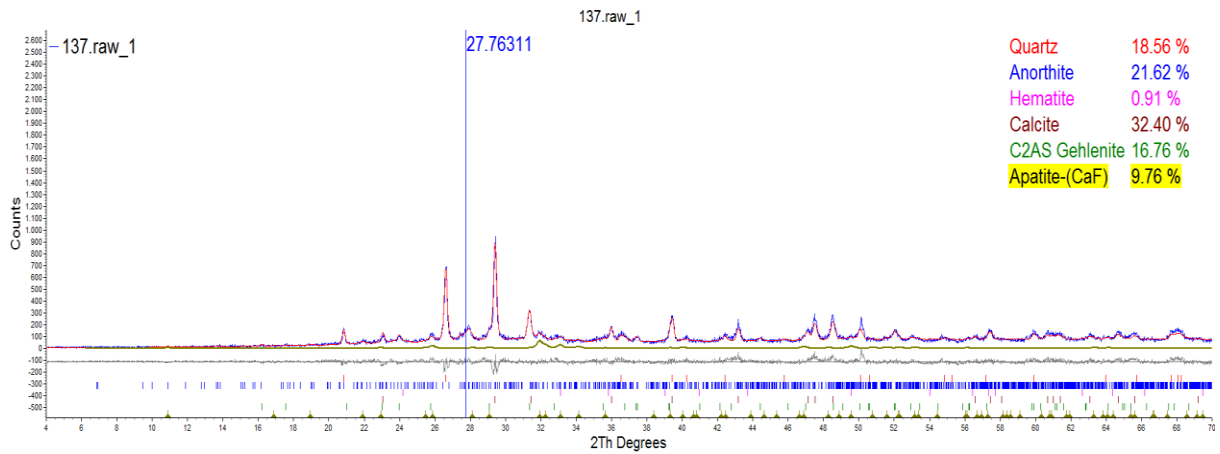
Sample 130



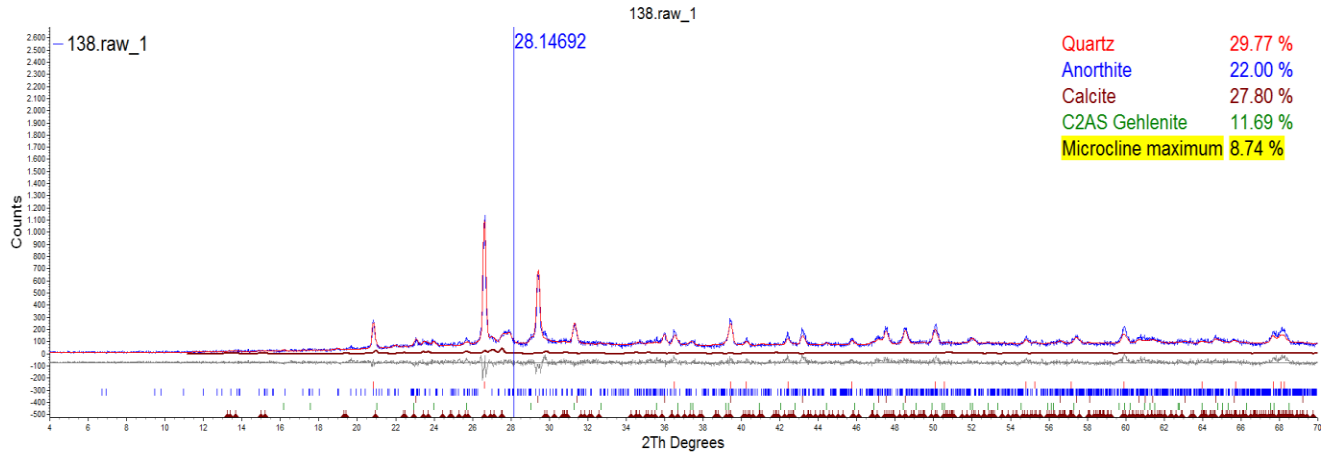
Sample 135



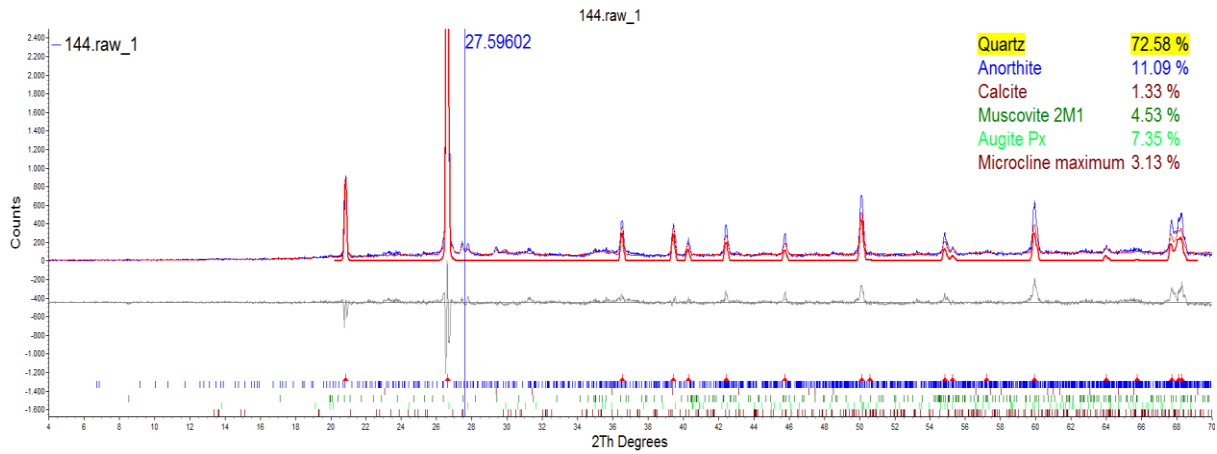
Sample 136



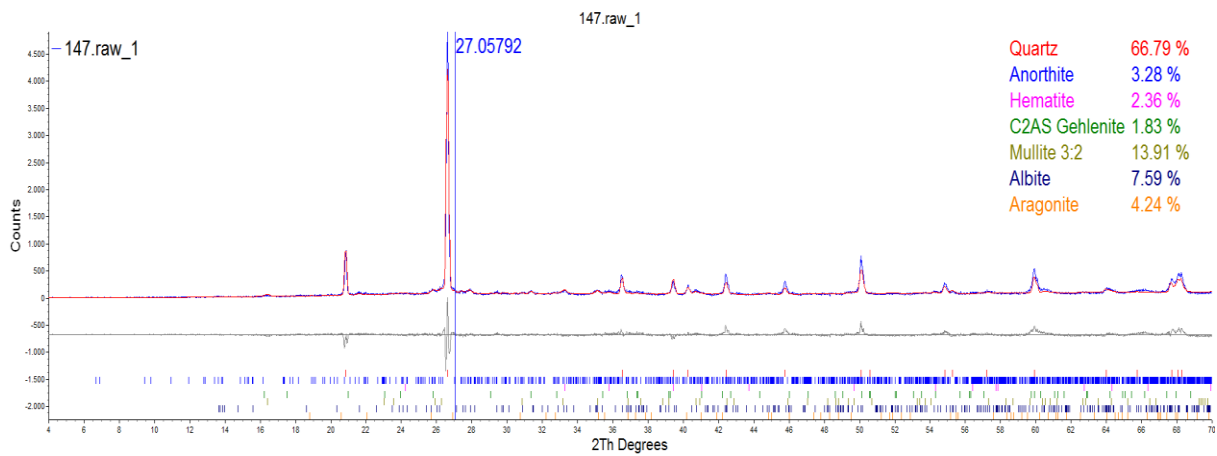
Sample 137



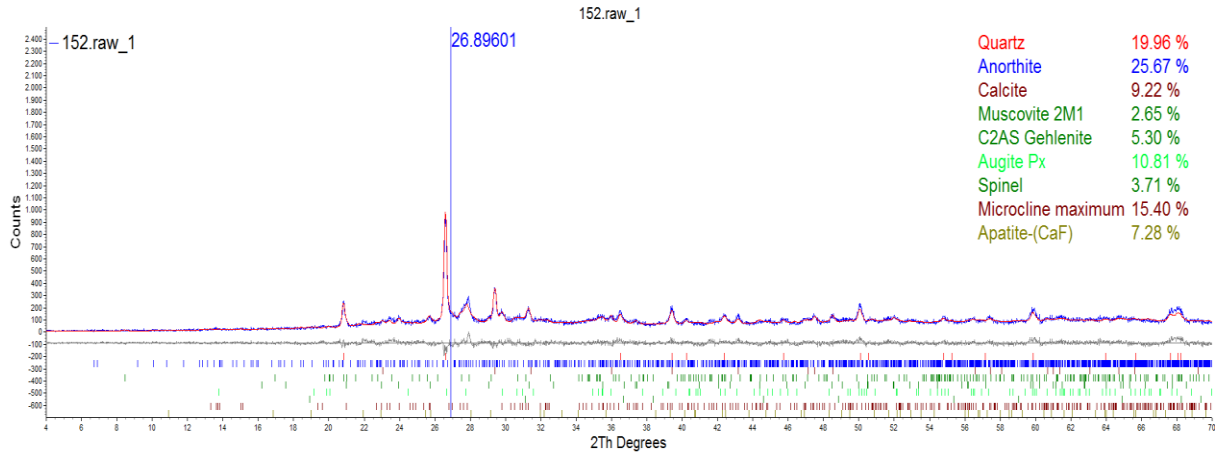
Sample 138



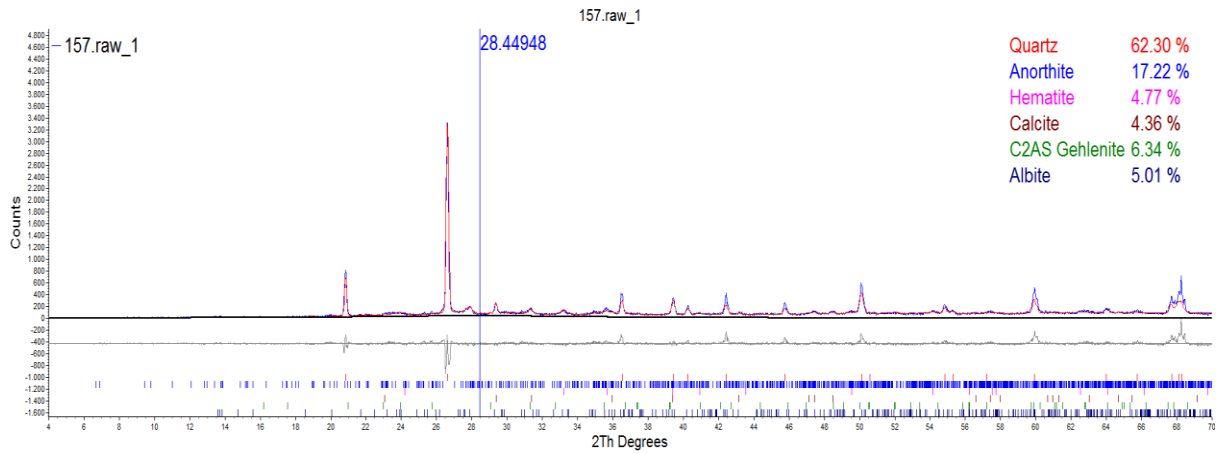
Sample 144



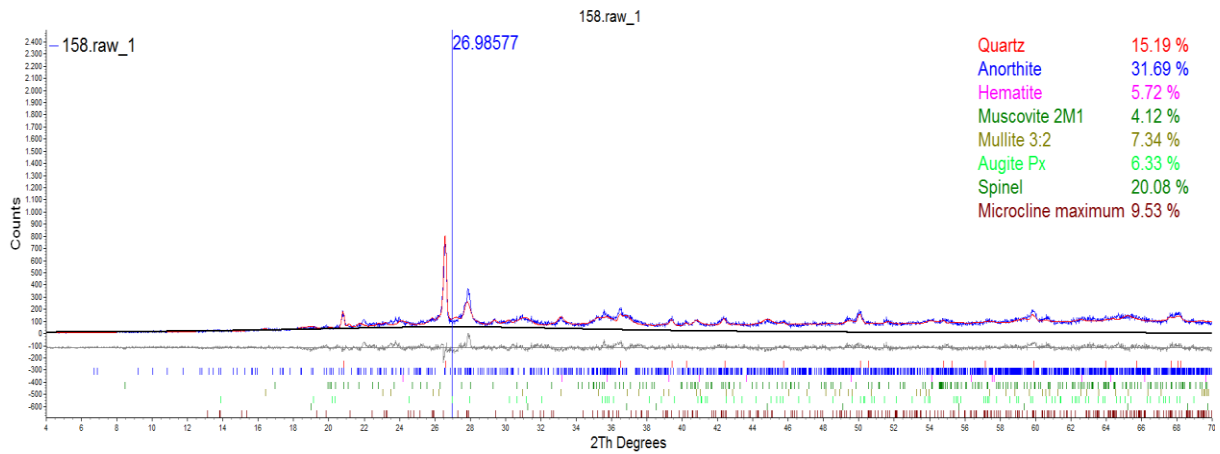
Sample 147



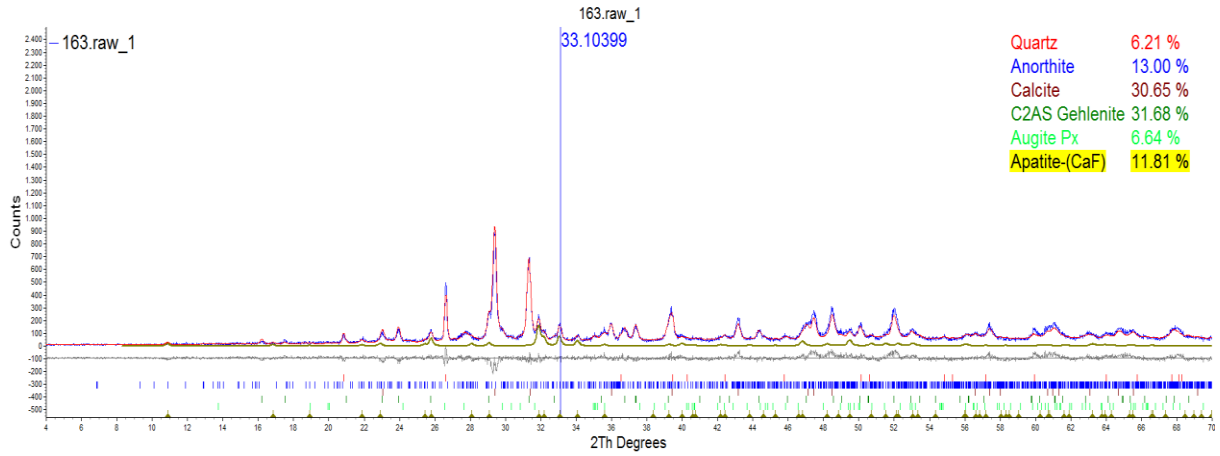
Sample 152



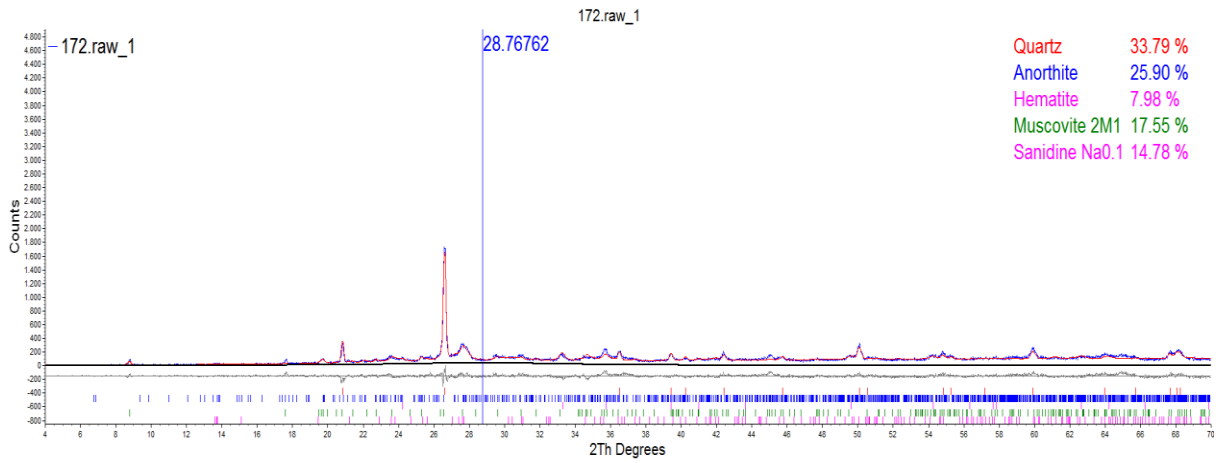
Sample 157



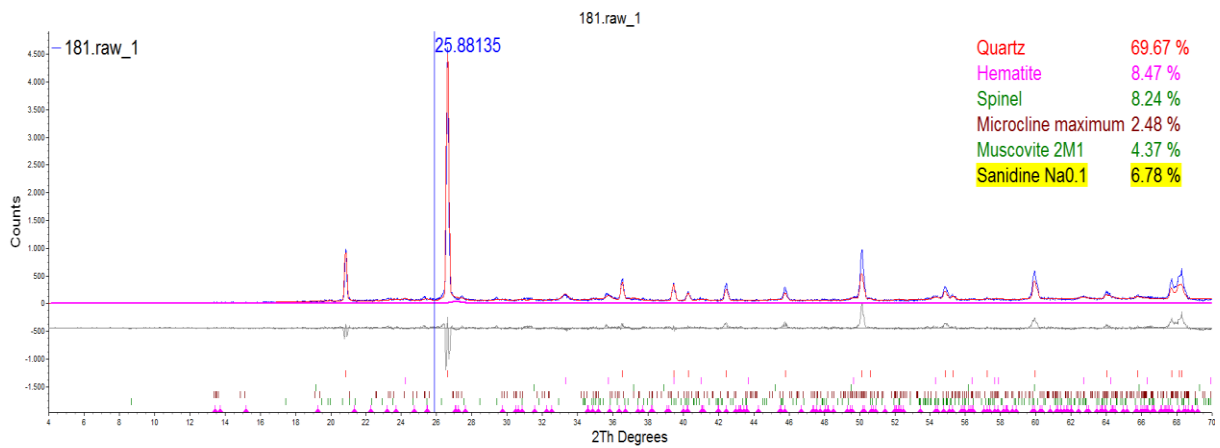
Sample 158



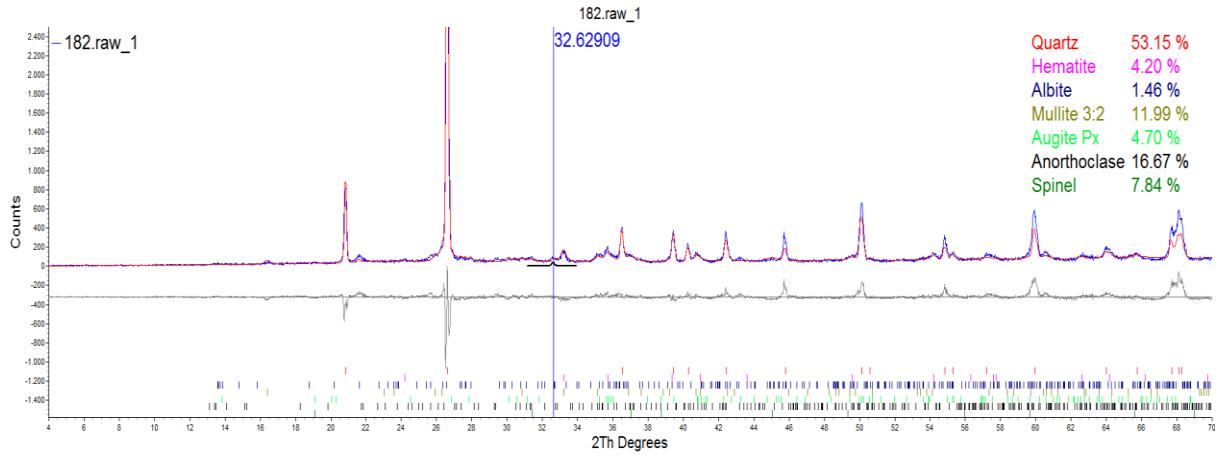
Sample 163



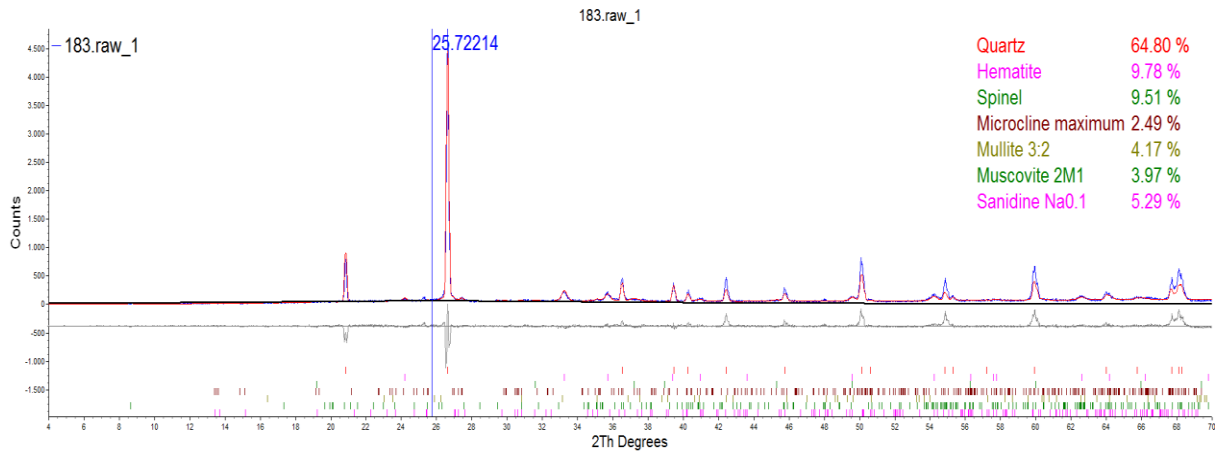
Sample 172



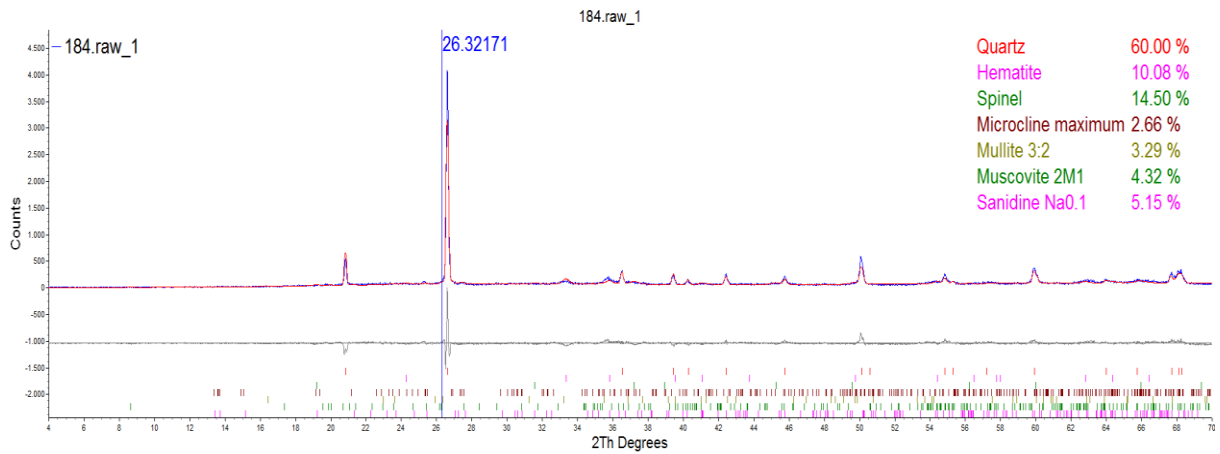
Sample 181



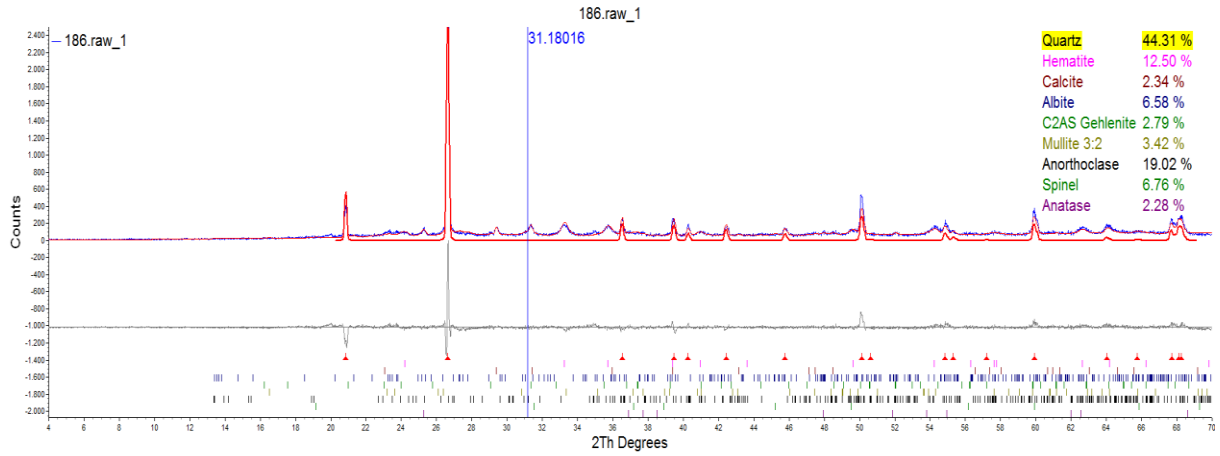
Sample 182



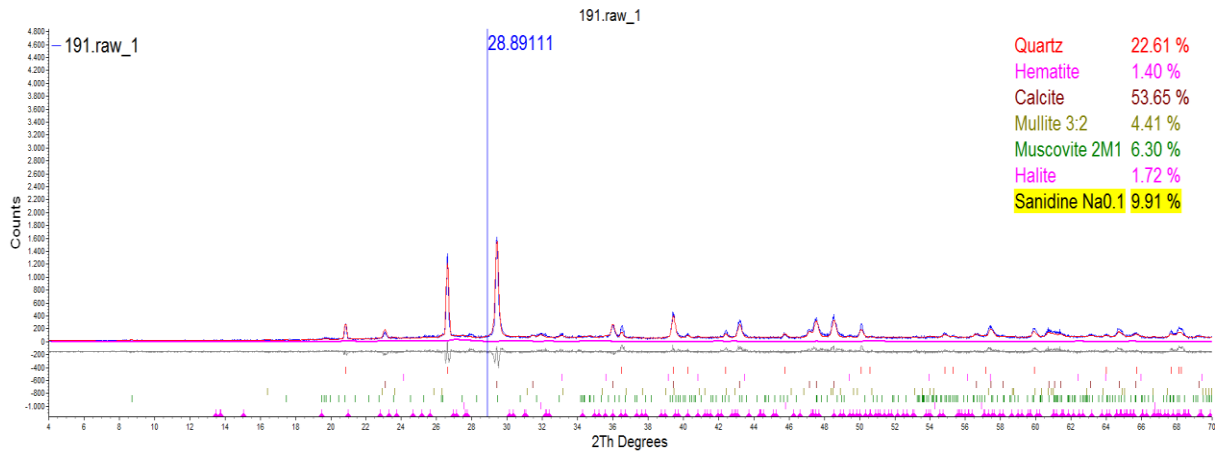
Sample 183



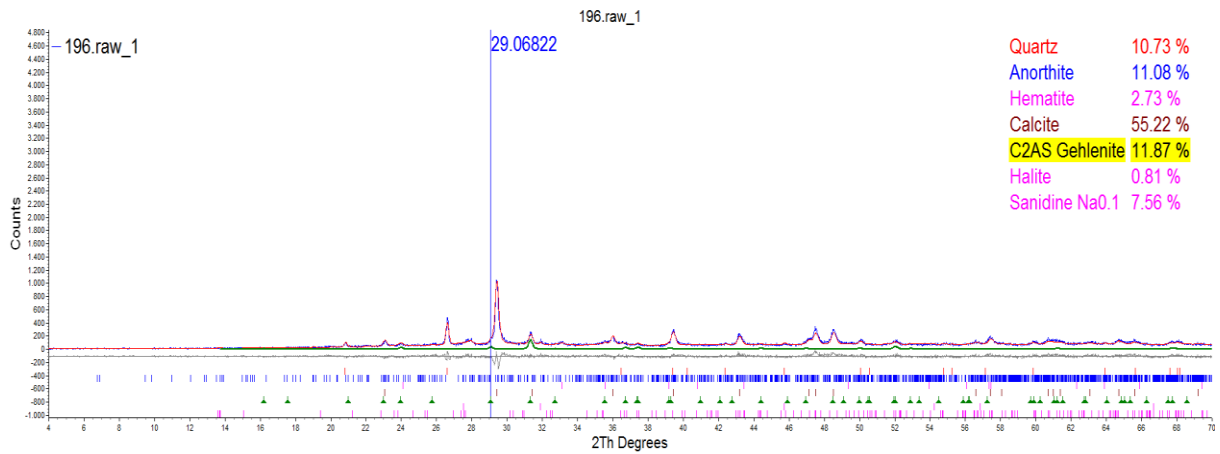
Sample 184



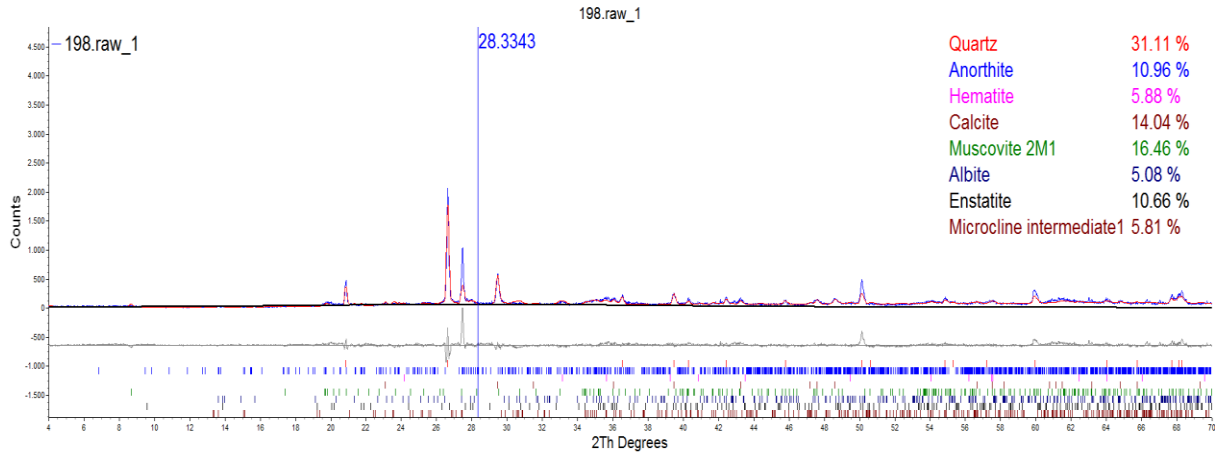
Sample 186



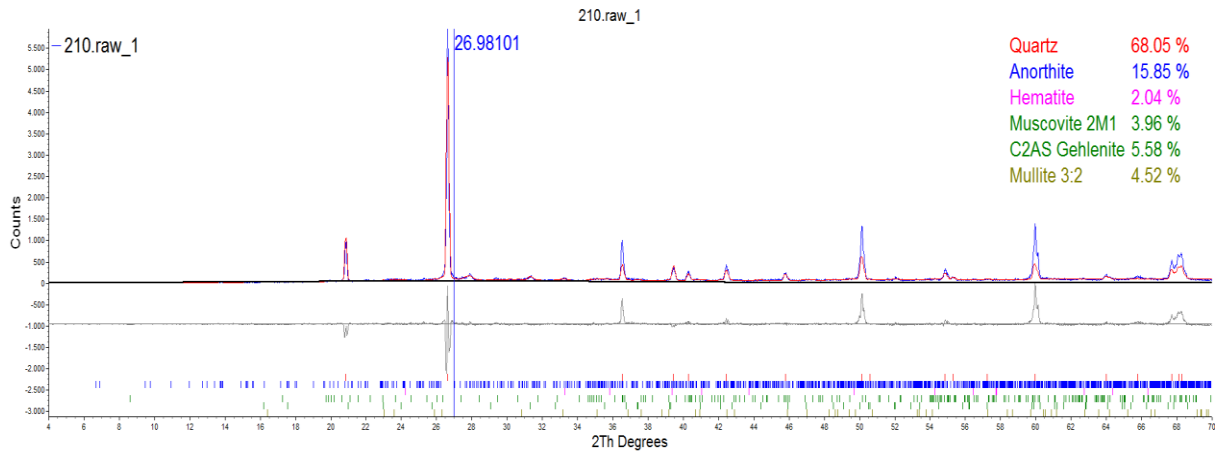
Sample 191



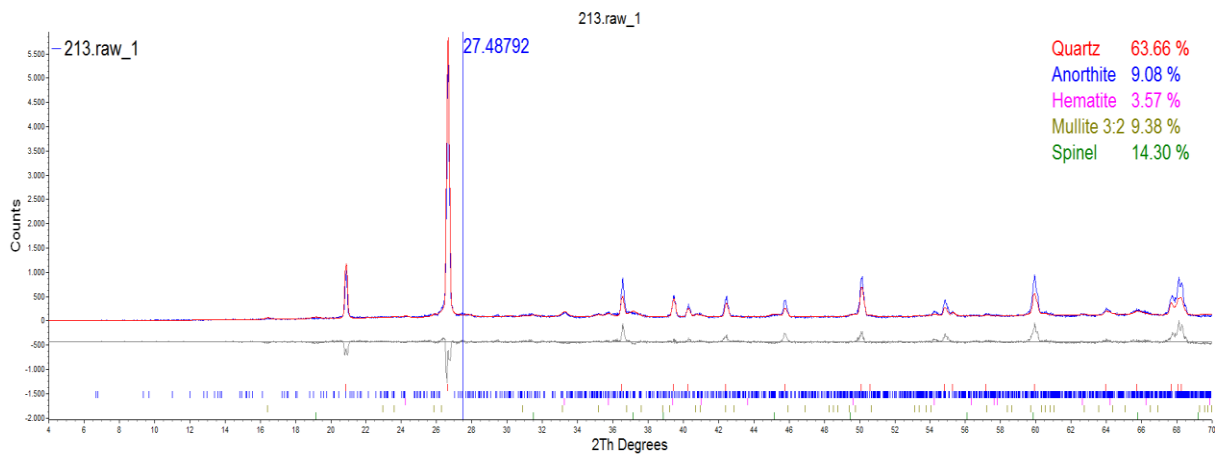
Sample 196



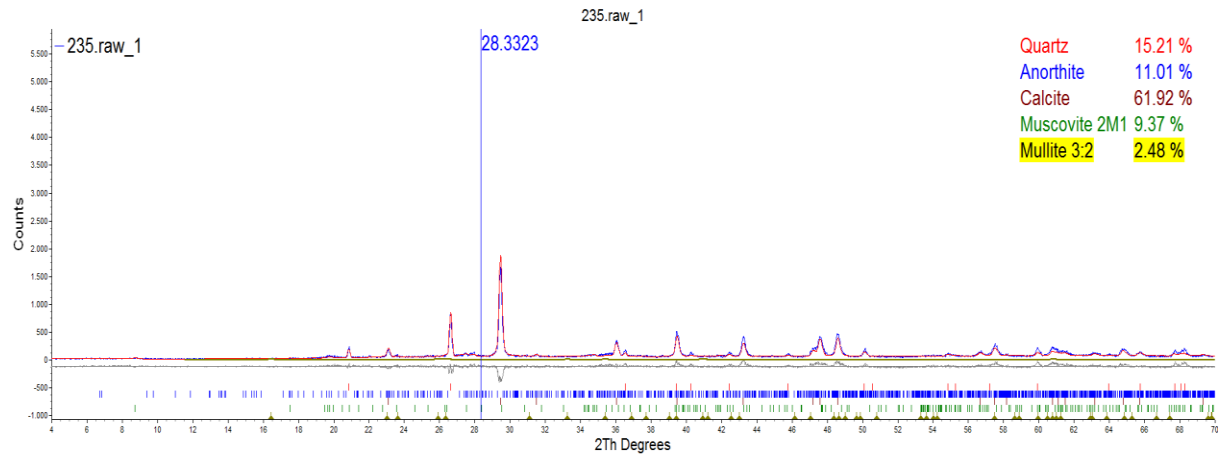
Sample 198



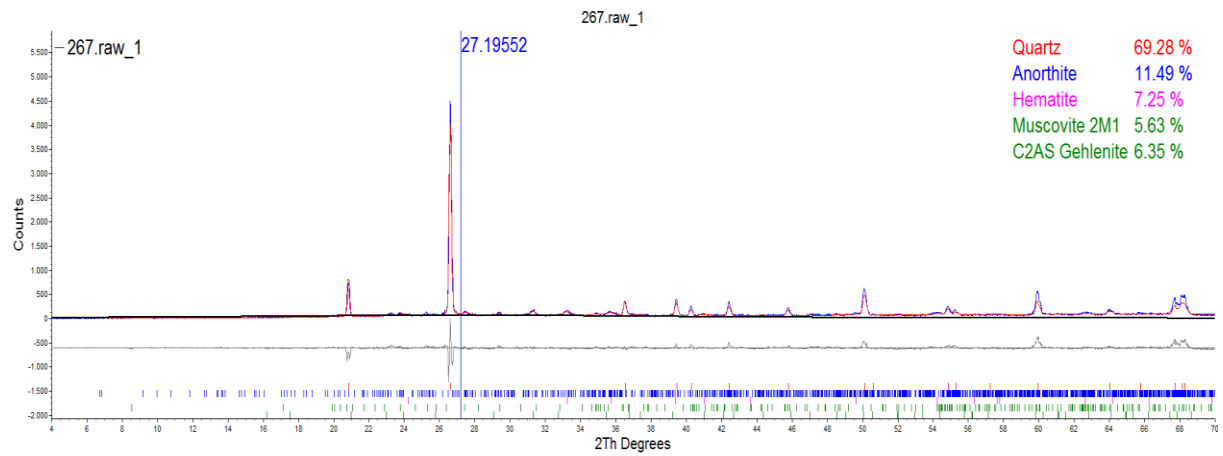
Sample 210



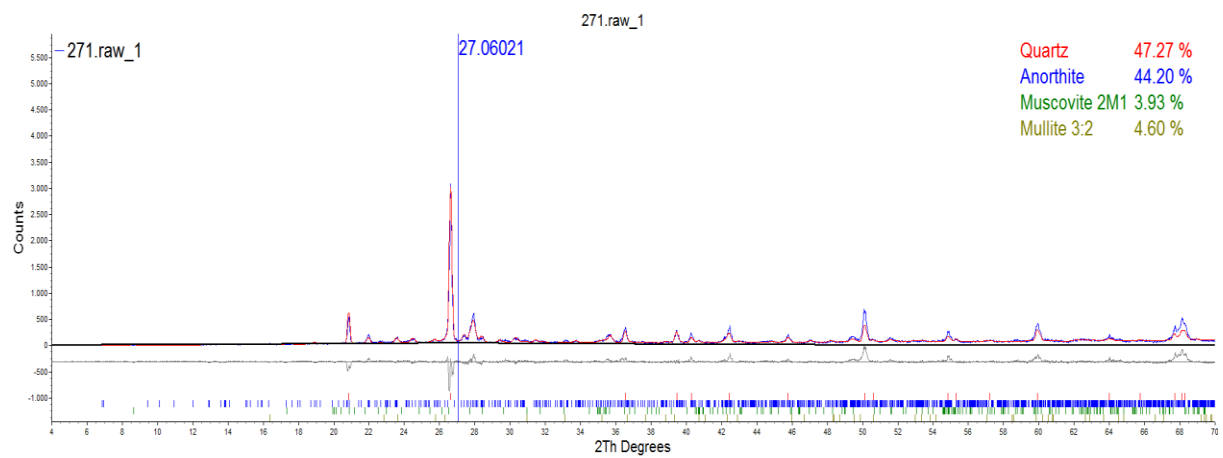
Sample 213



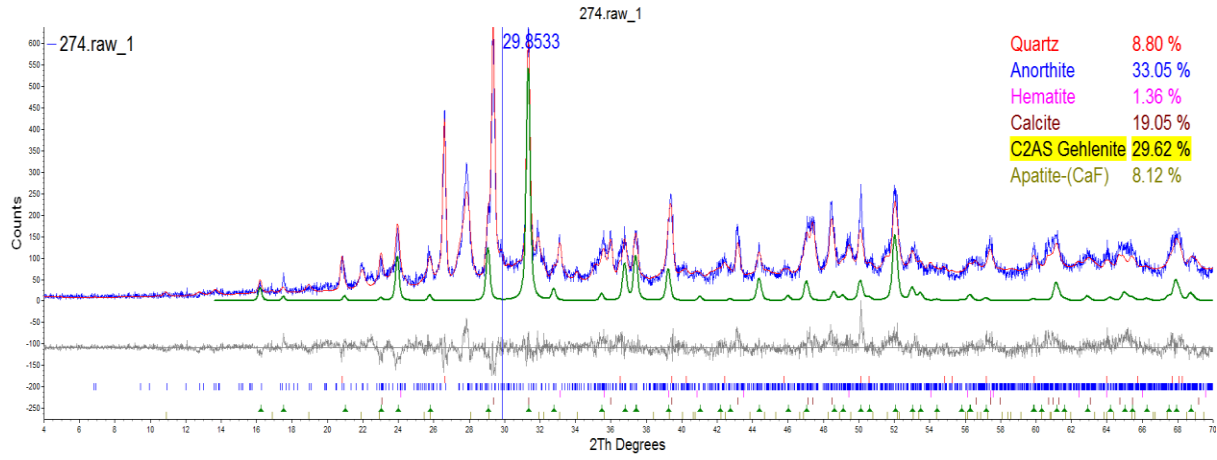
Sample 235



Sample 267

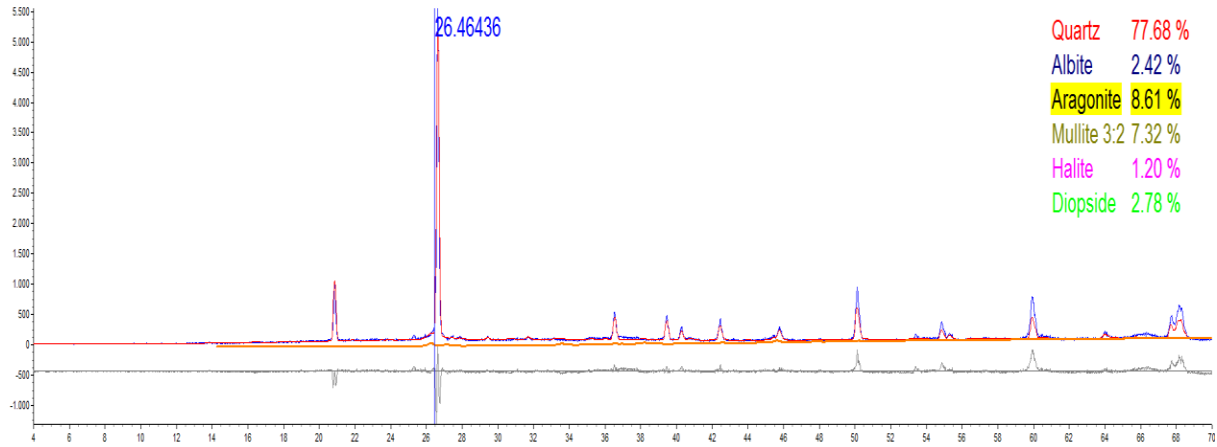


Sample 271

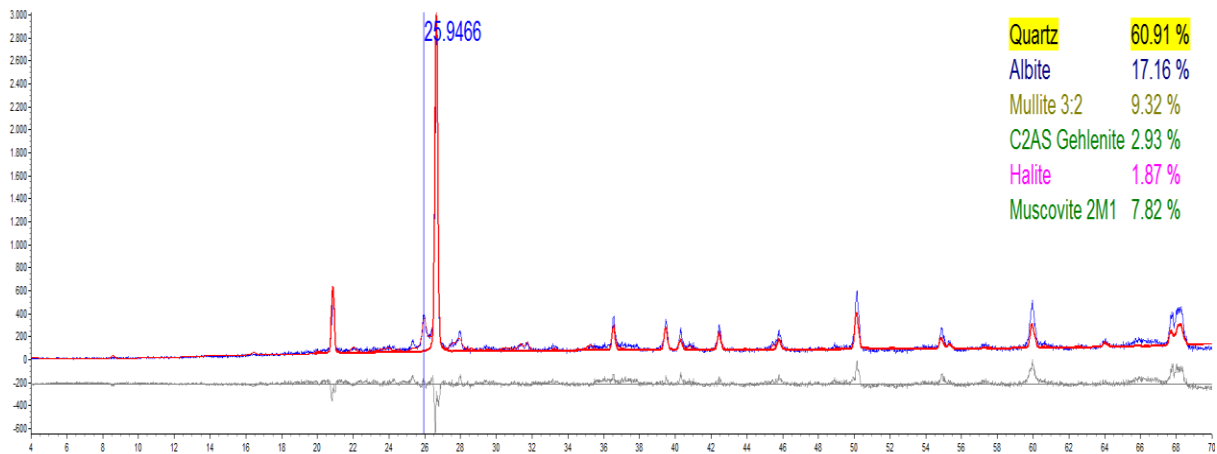


Sample 274

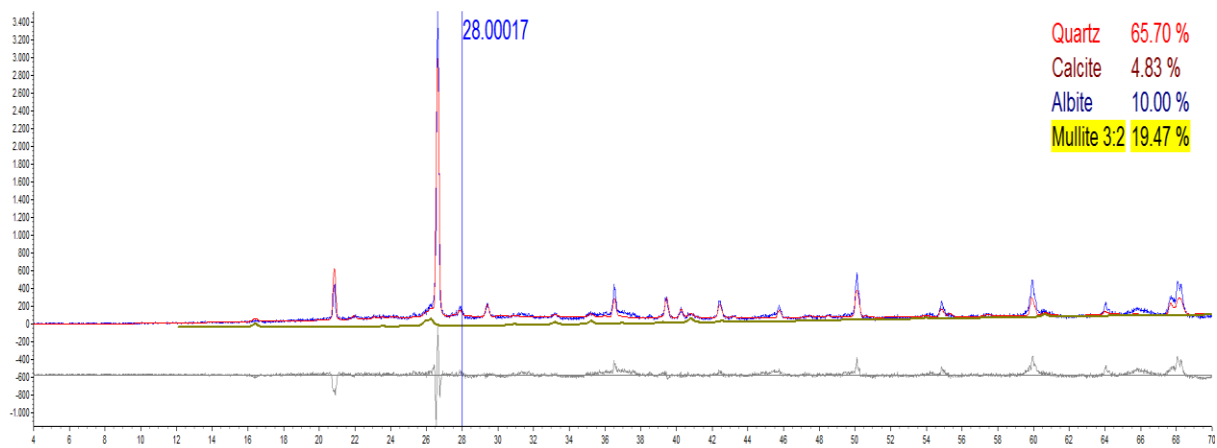
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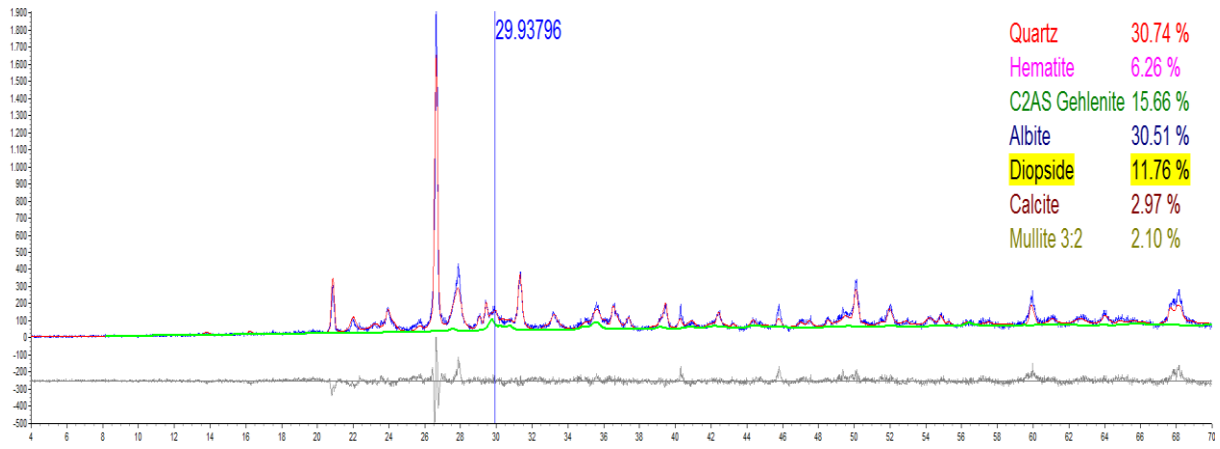
Sample 83



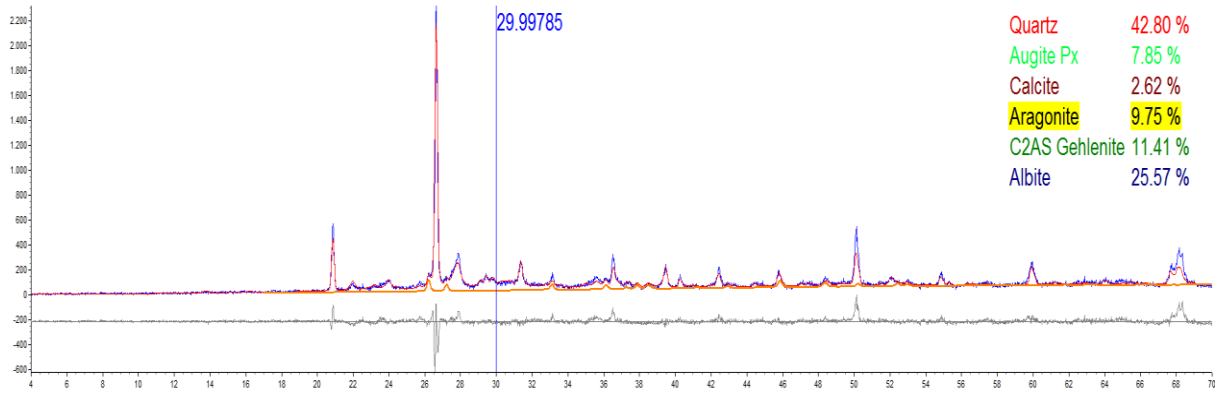
Sample 84



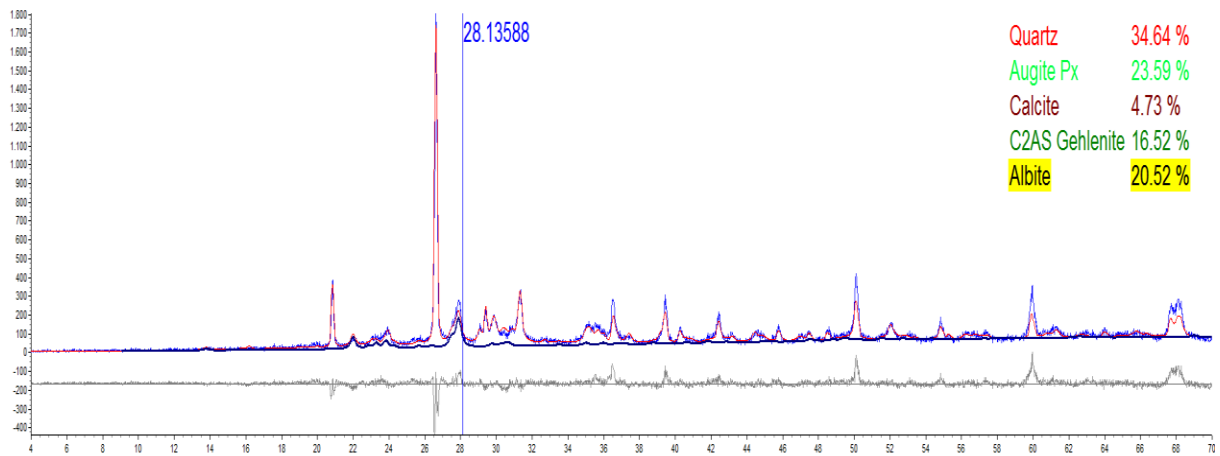
Sample 85



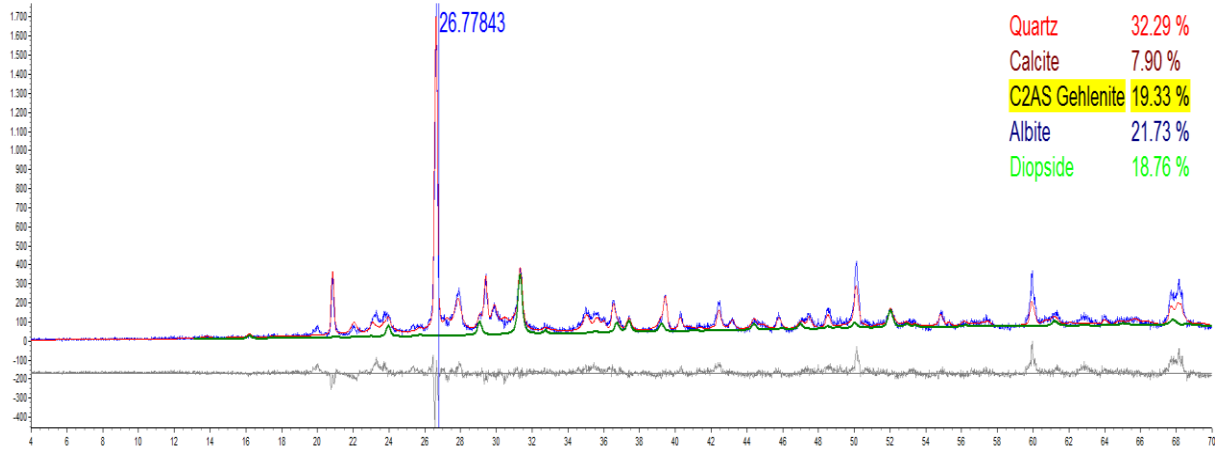
Sample 88



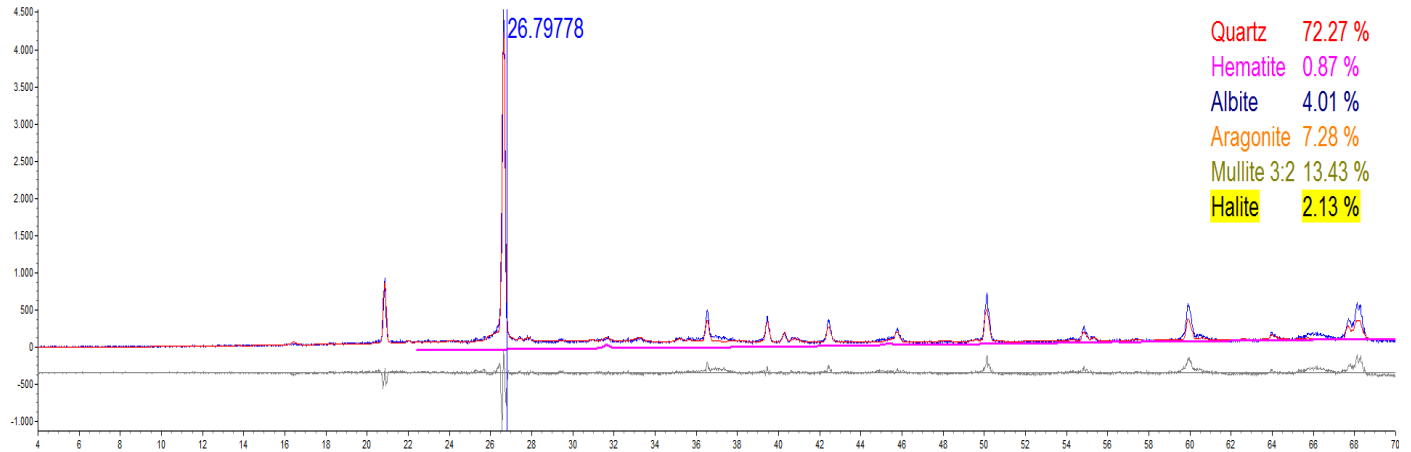
Sample 89



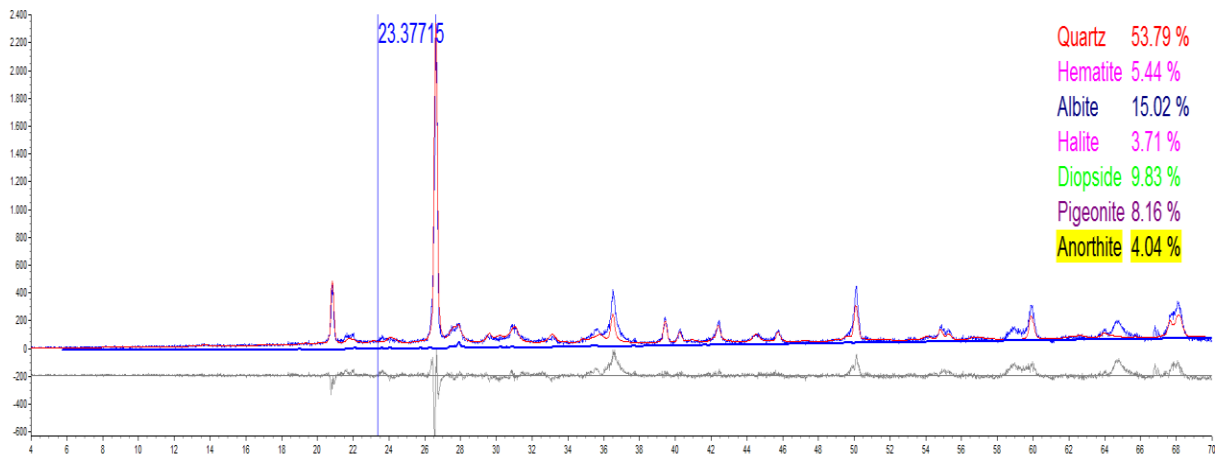
Sample 94



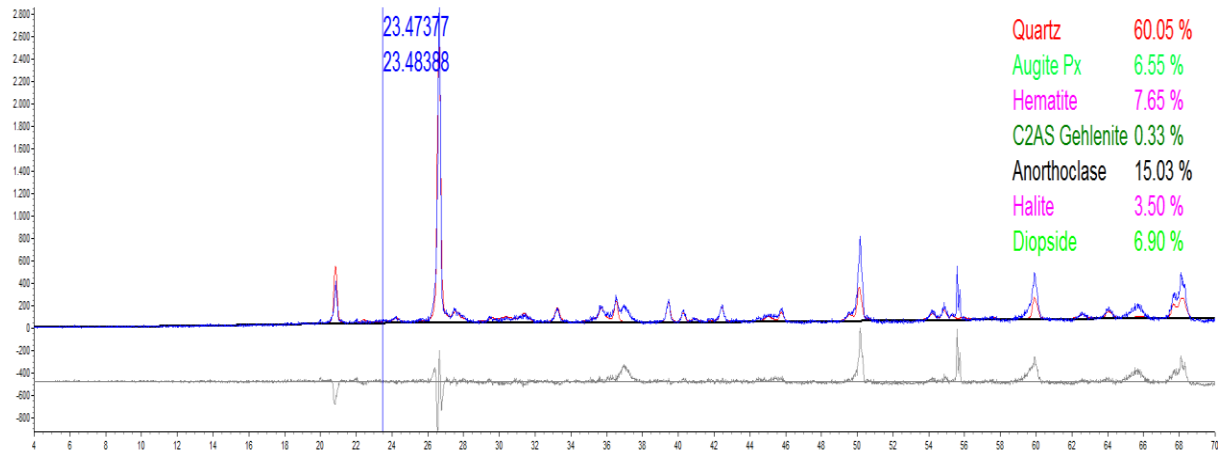
Sample 95



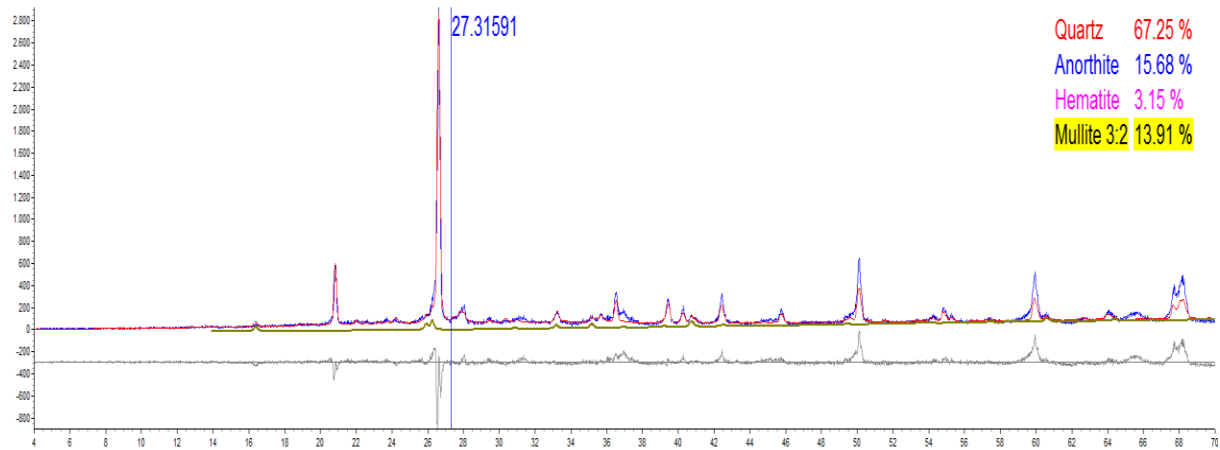
Sample 96



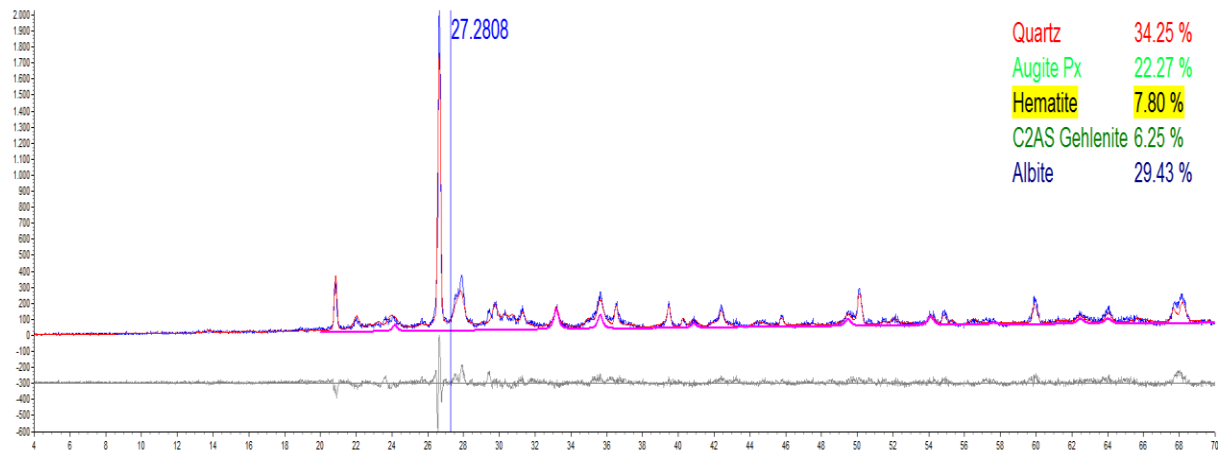
Sample 108



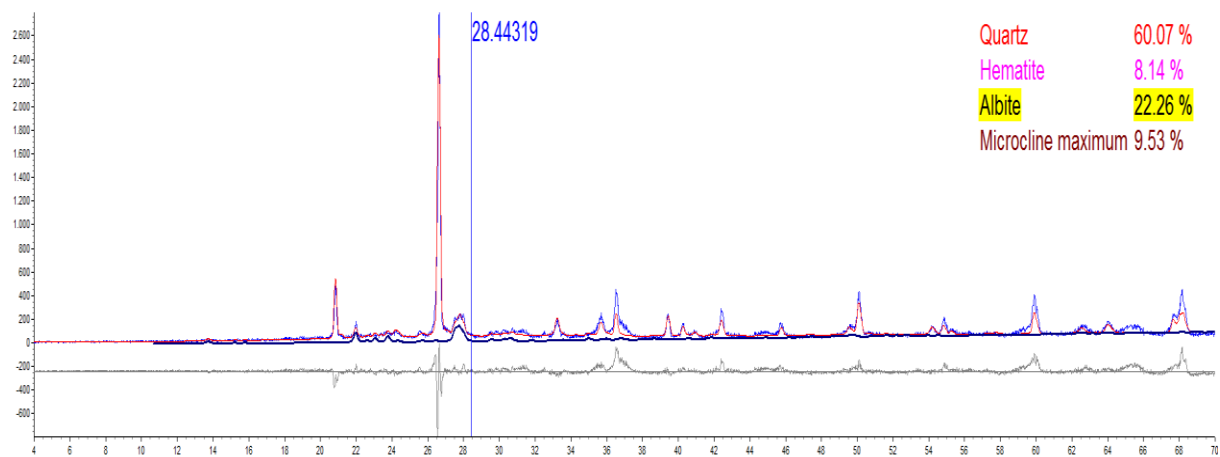
Sample 110



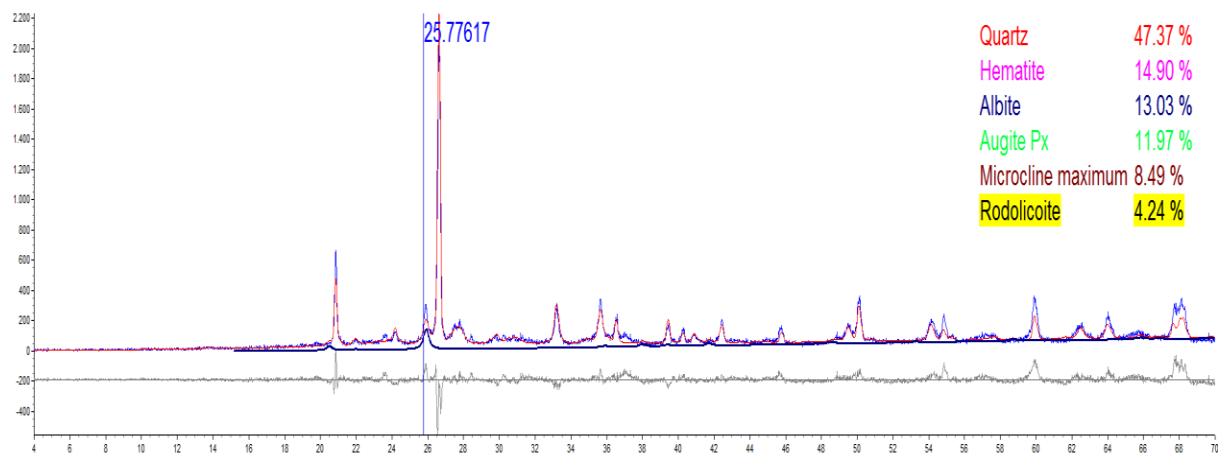
Sample 126



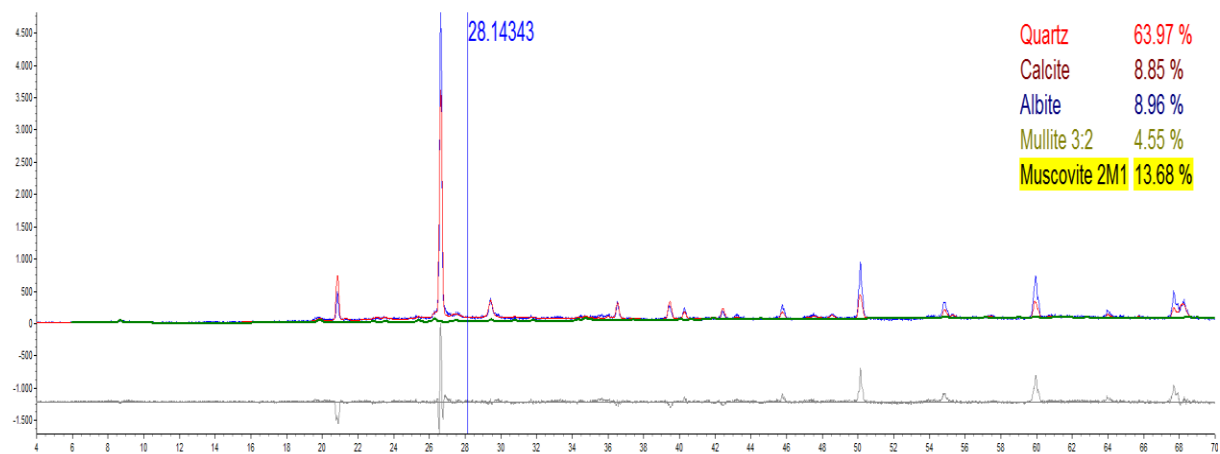
Sample 146



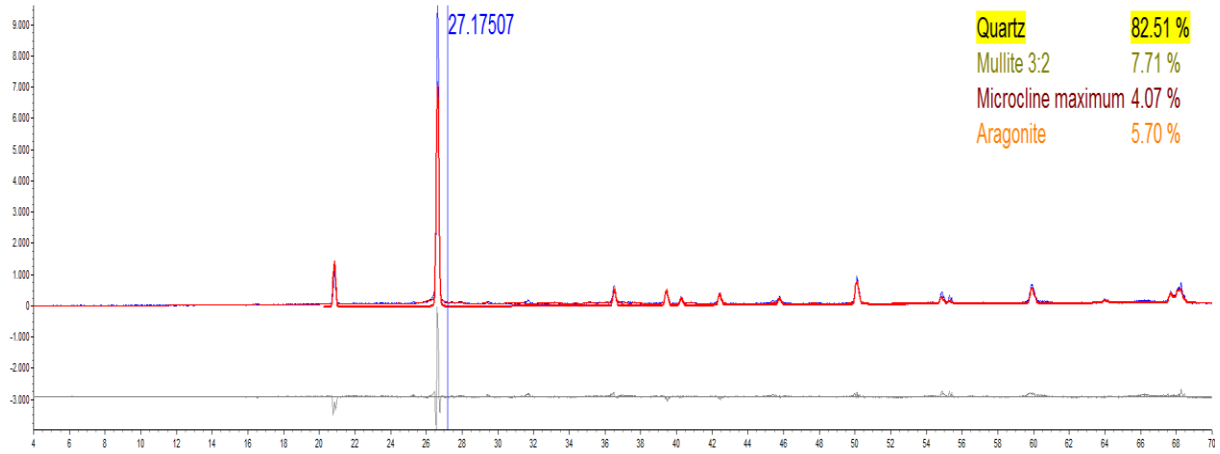
Sample 151



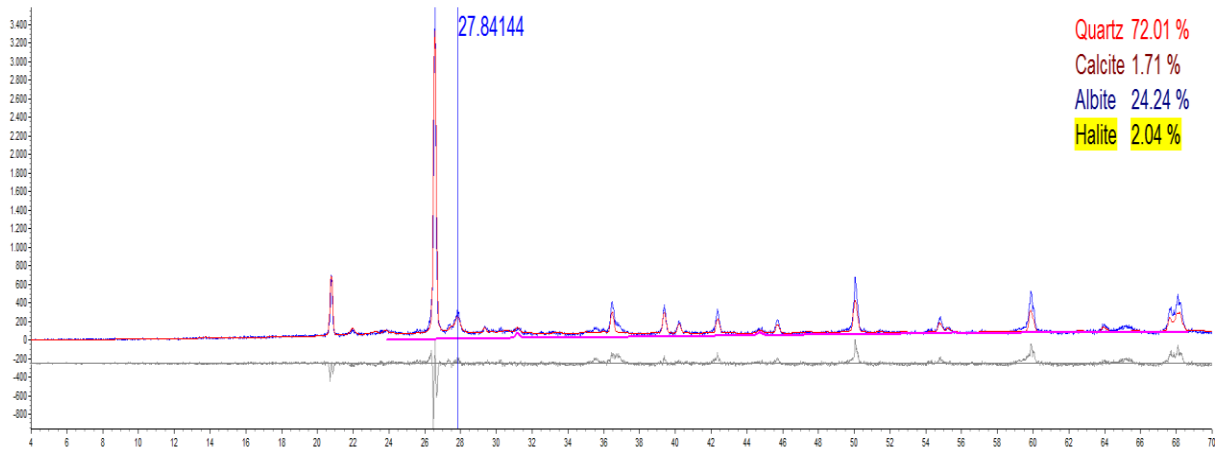
Sample 158



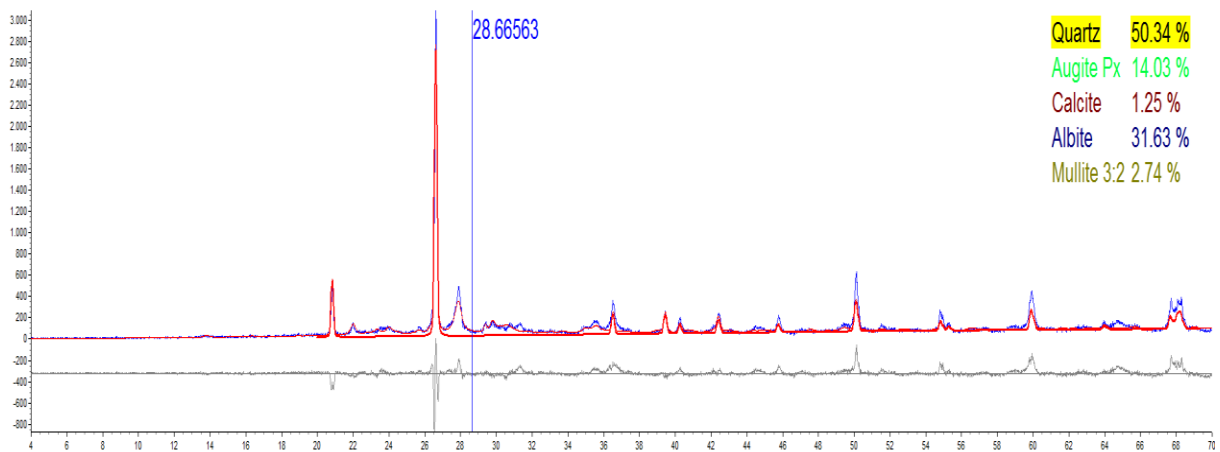
Sample 231



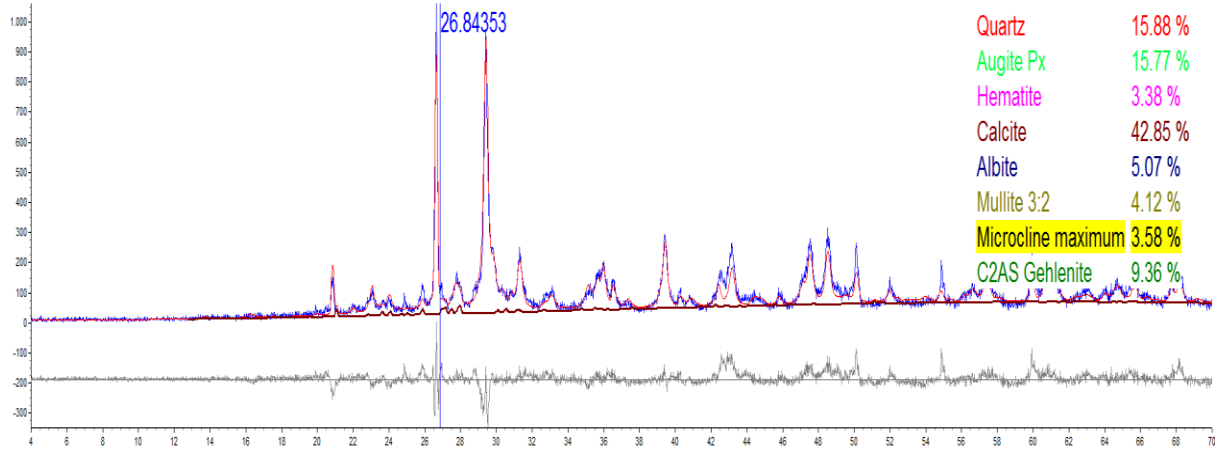
Sample 282



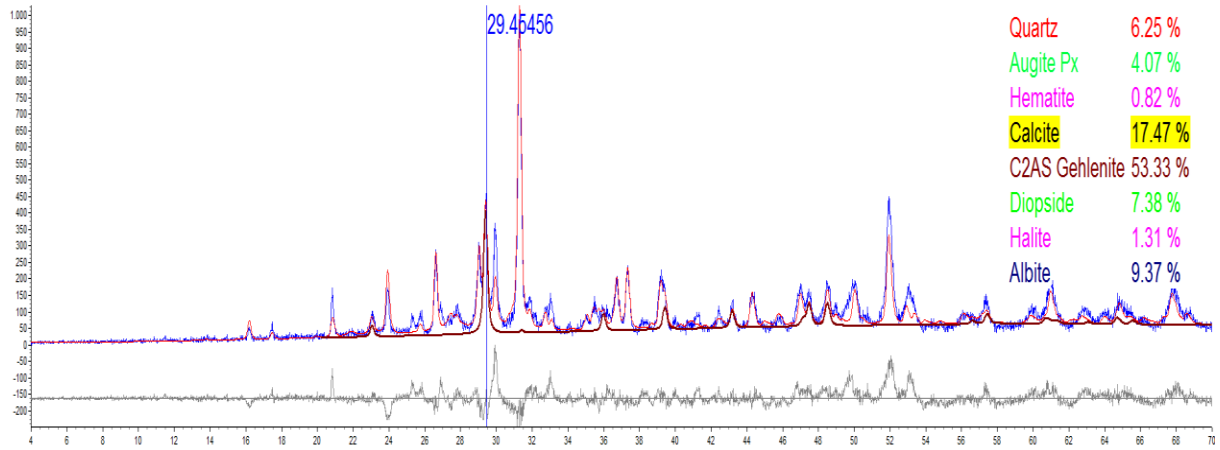
Sample 318



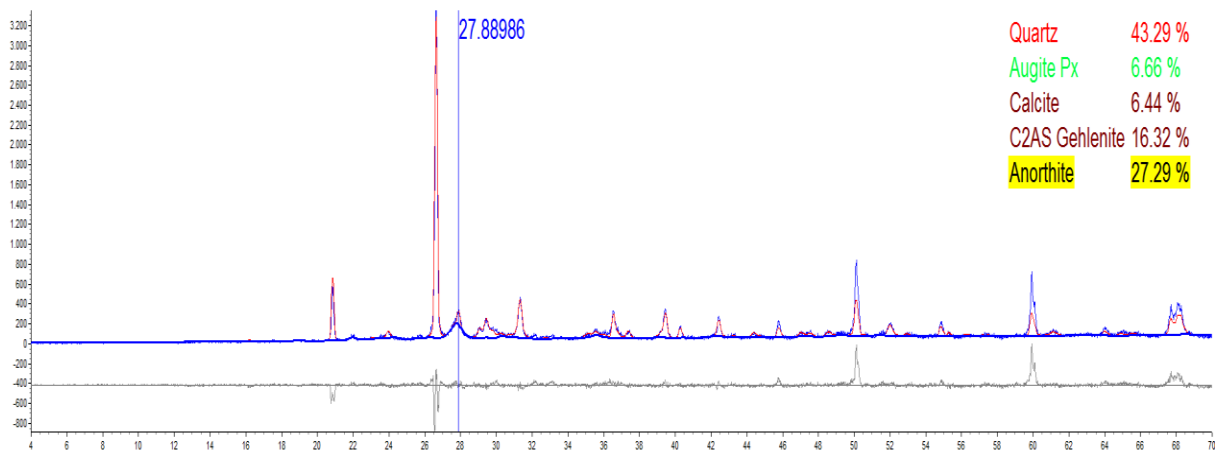
Sample 321



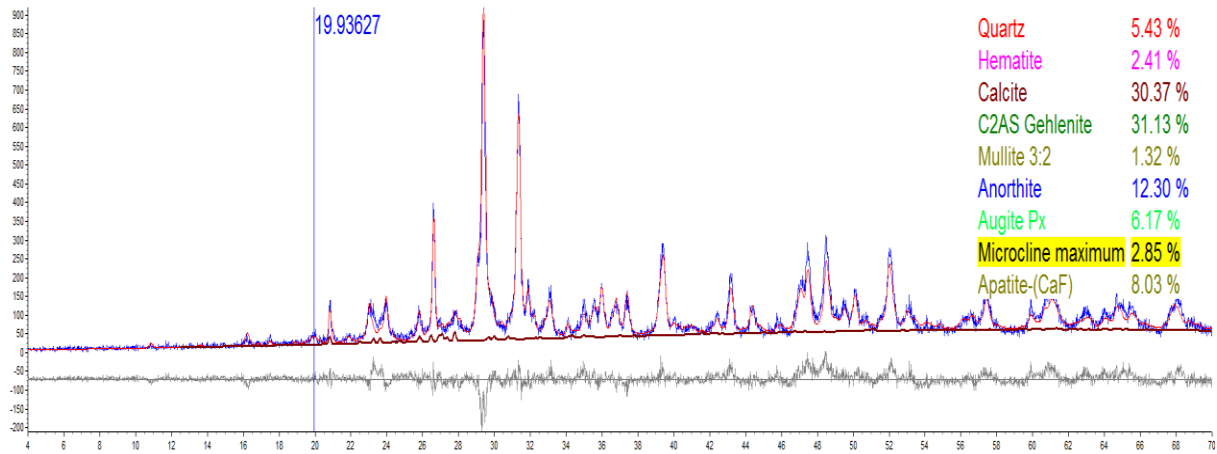
Sample 322



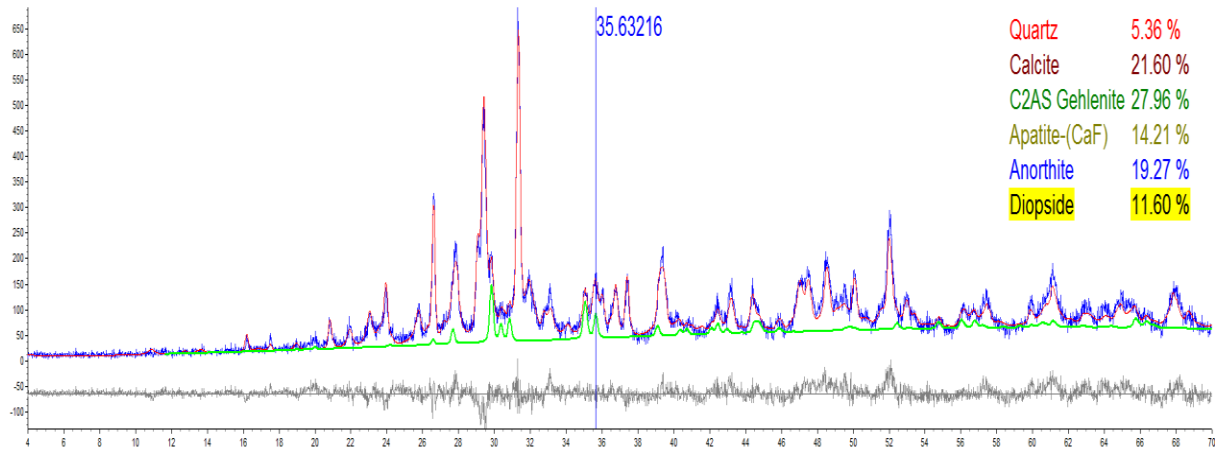
Sample 326



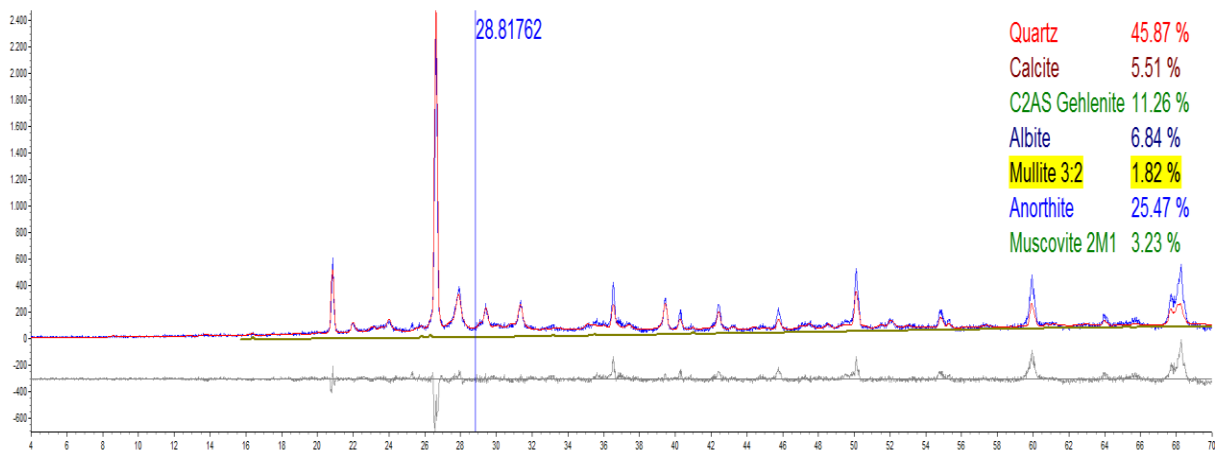
Sample 340



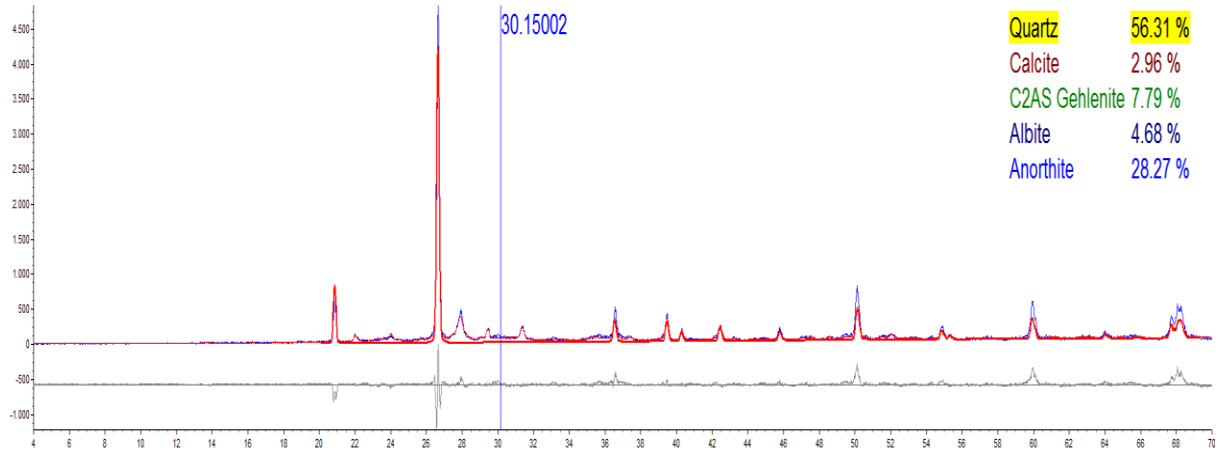
Sample 343



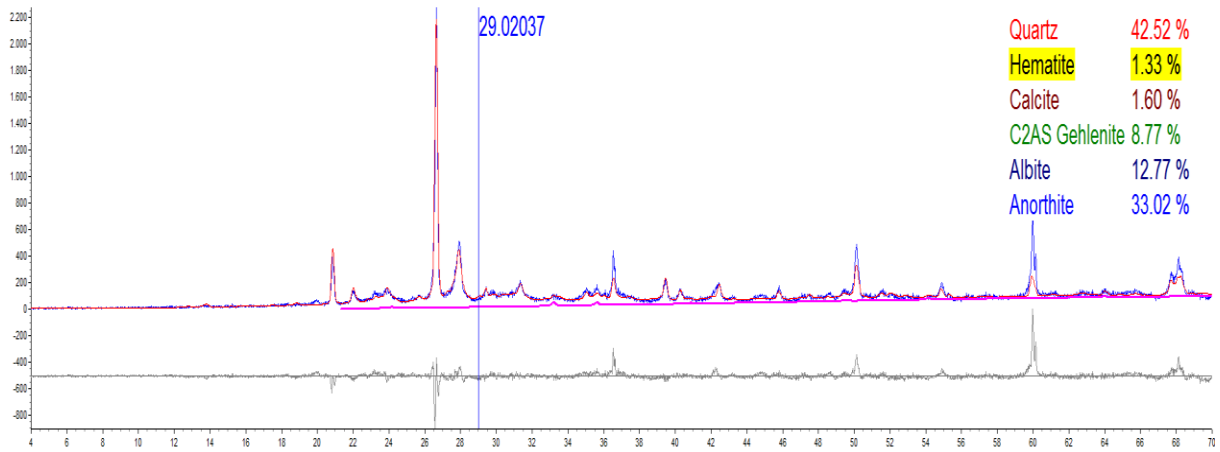
Sample 562



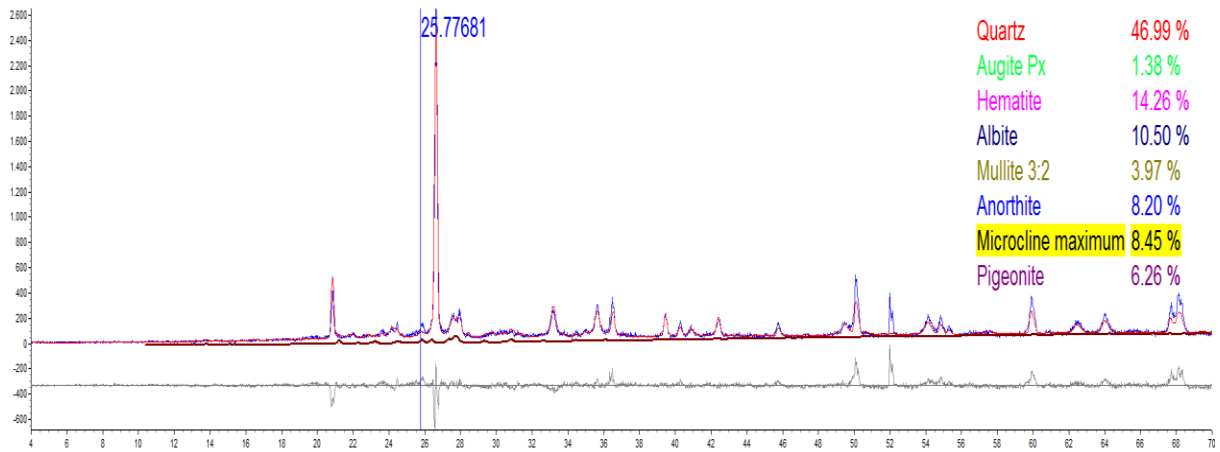
Sample 610



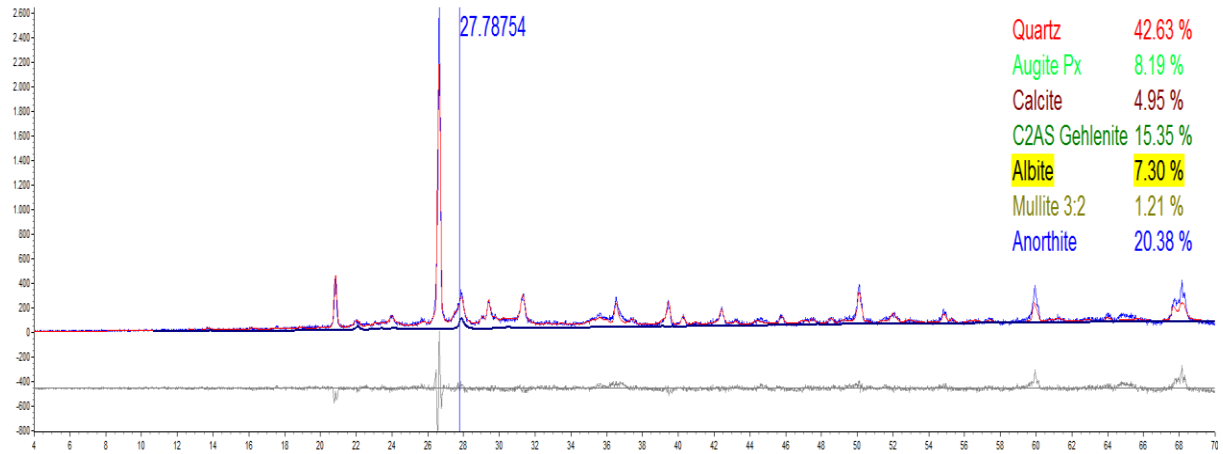
Sample 612



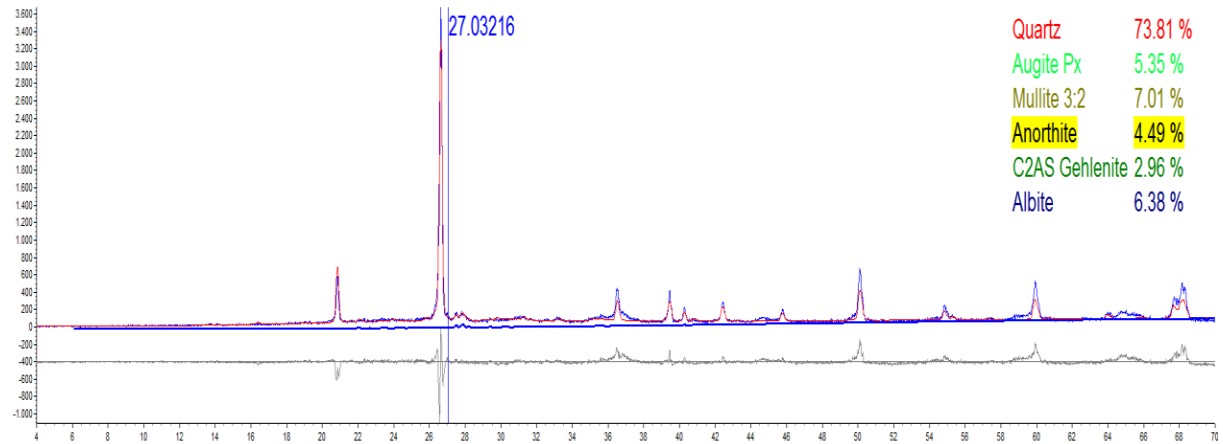
Sample 616



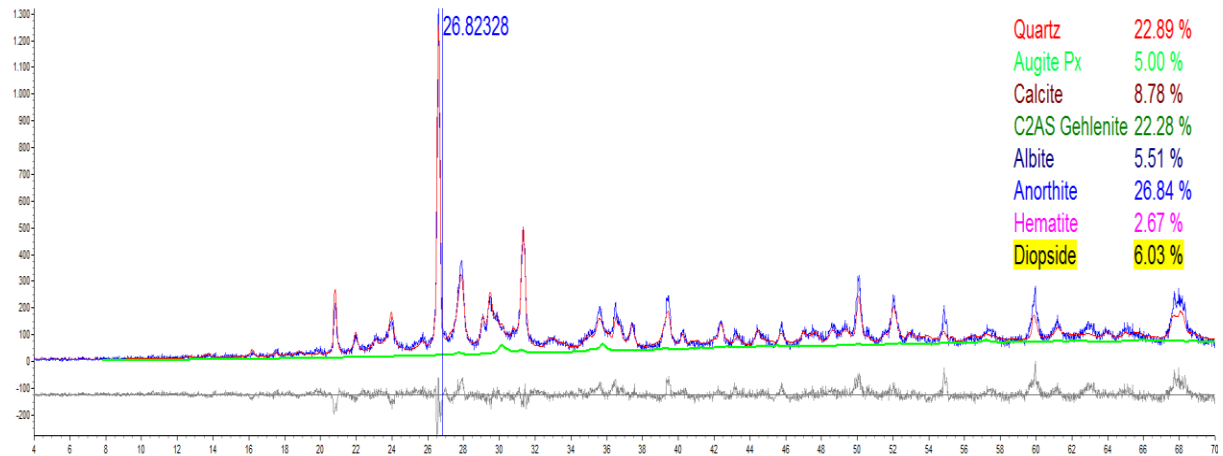
Sample 617



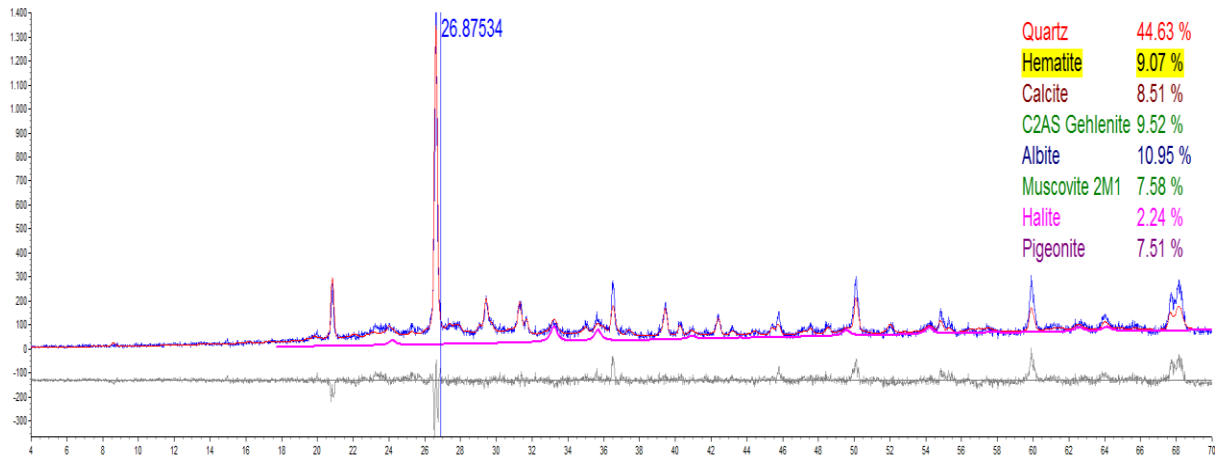
Sample 622



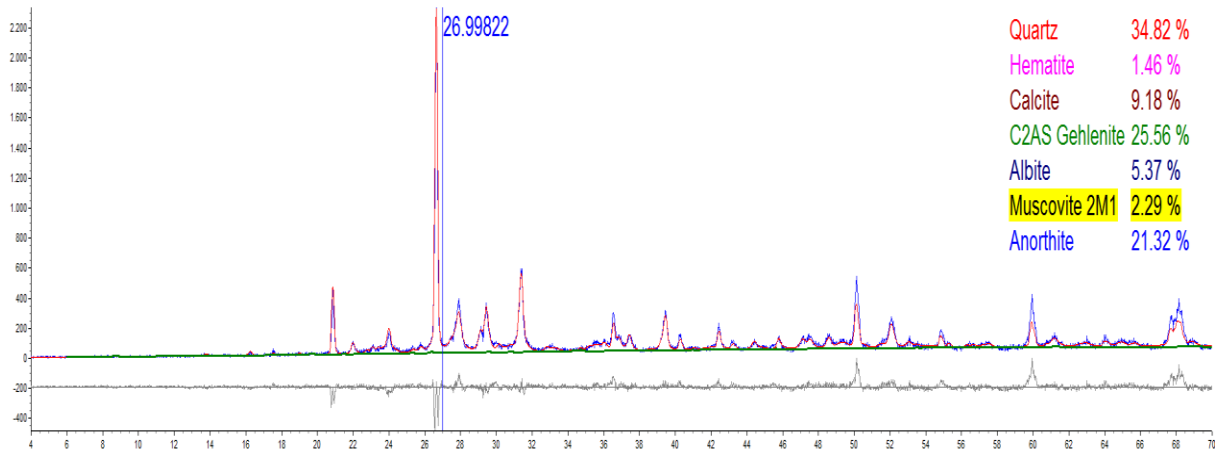
Sample 639



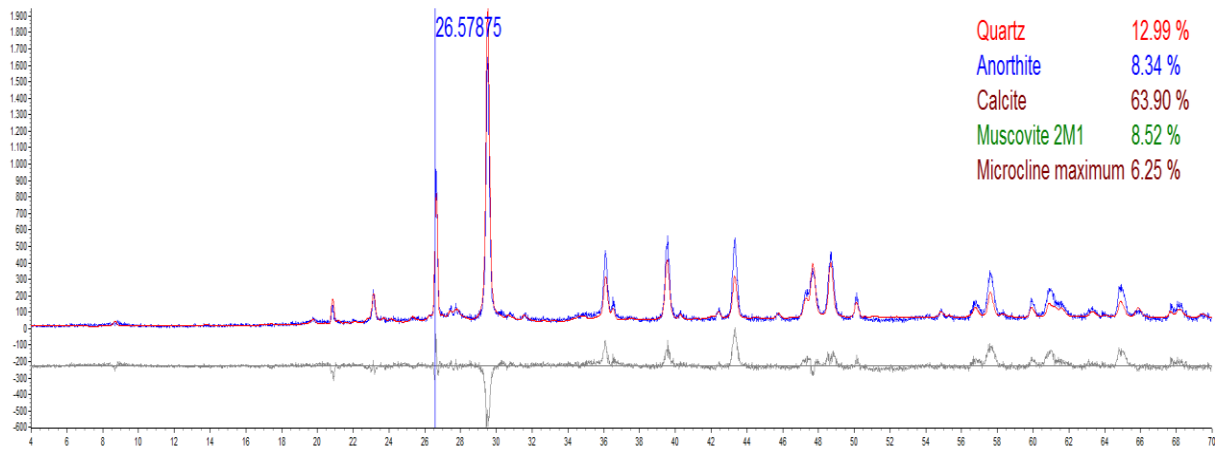
Sample 641



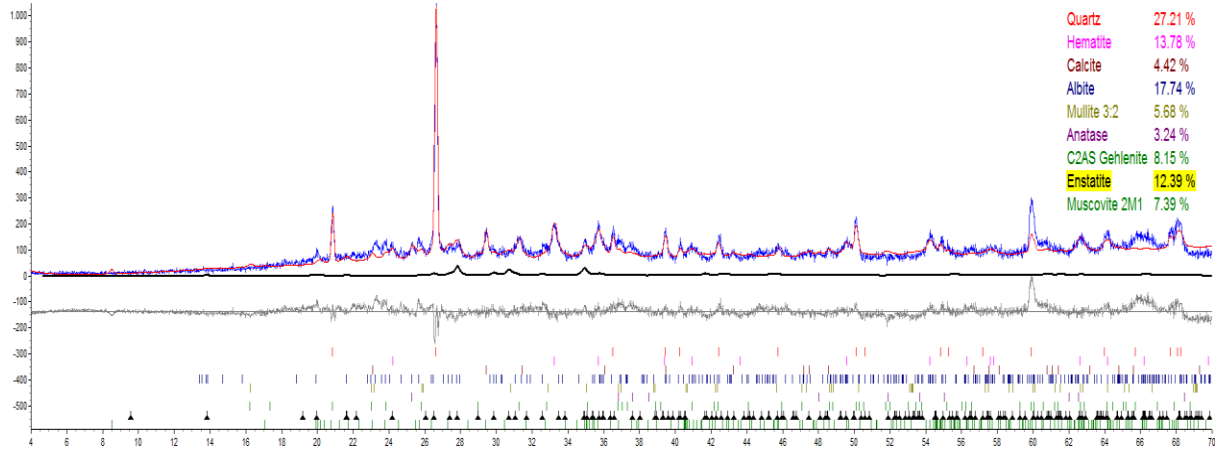
Sample 647



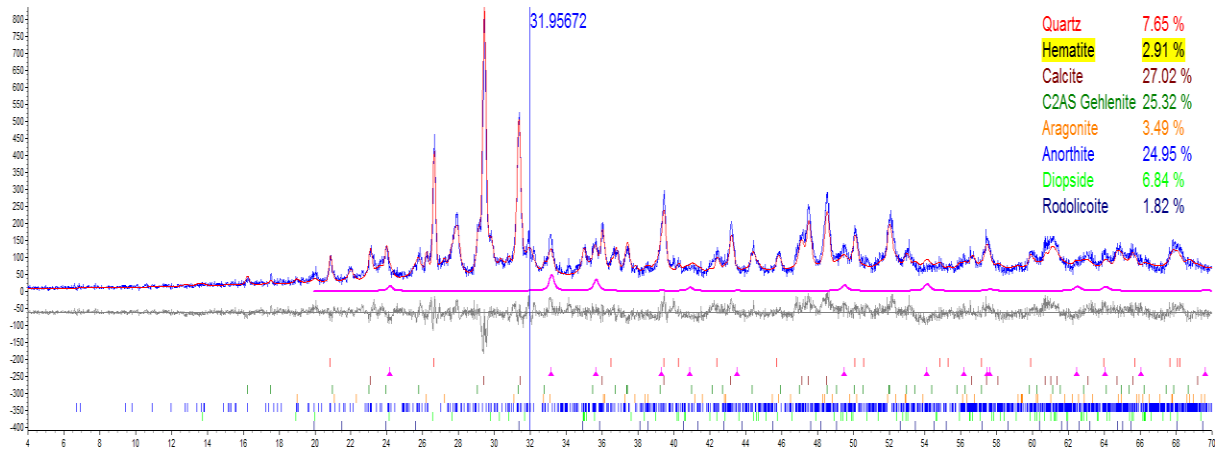
Sample 648



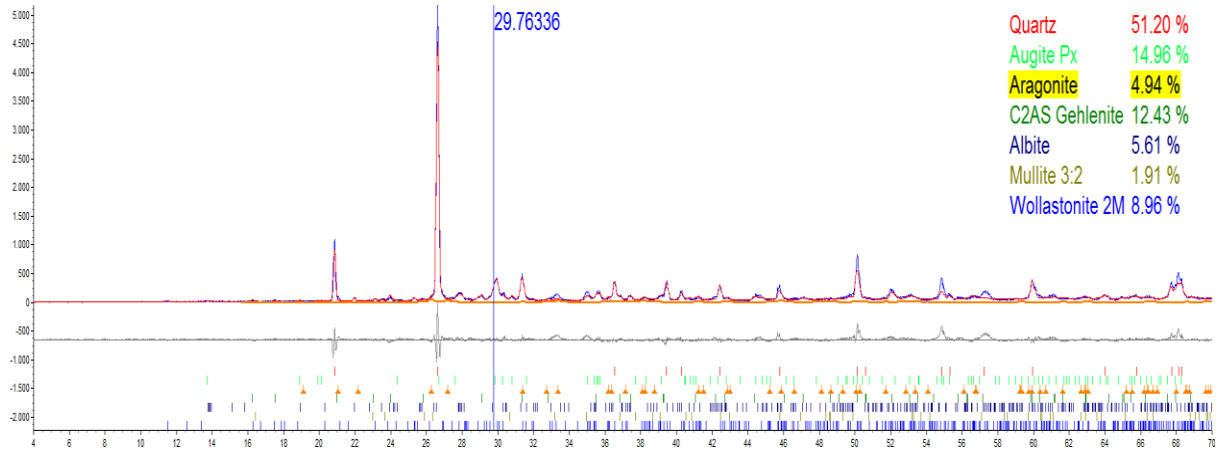
Sample 649



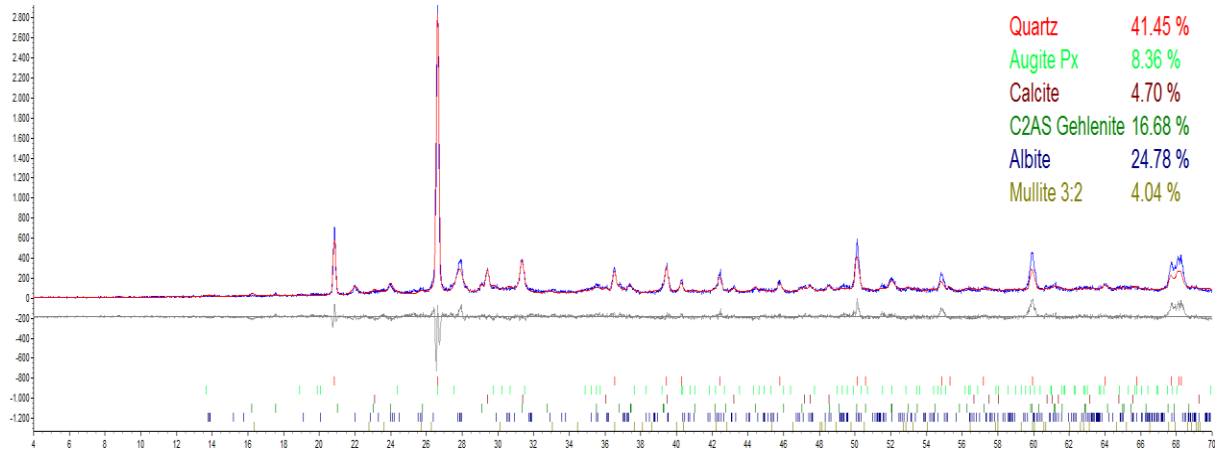
Sample 651



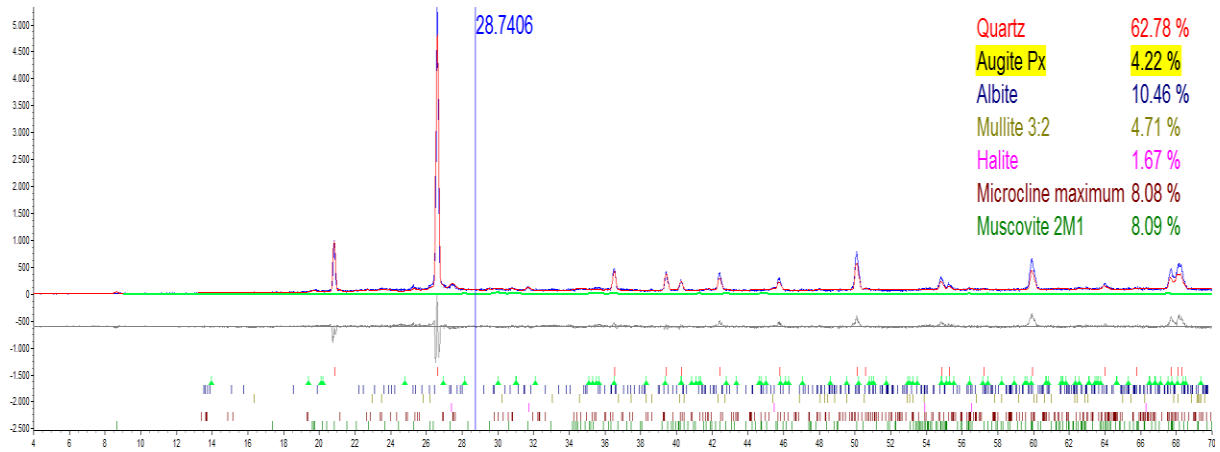
Sample 671



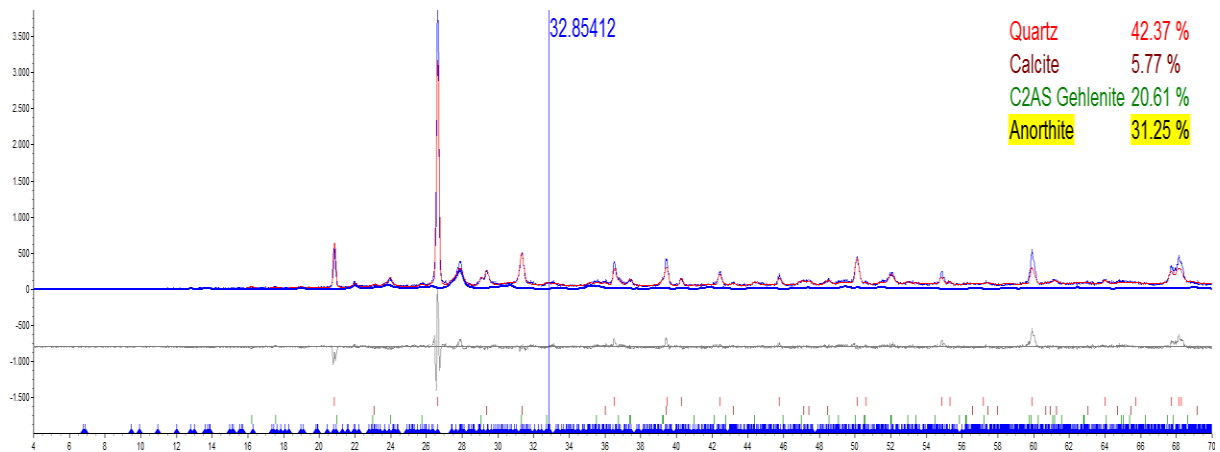
Sample 682



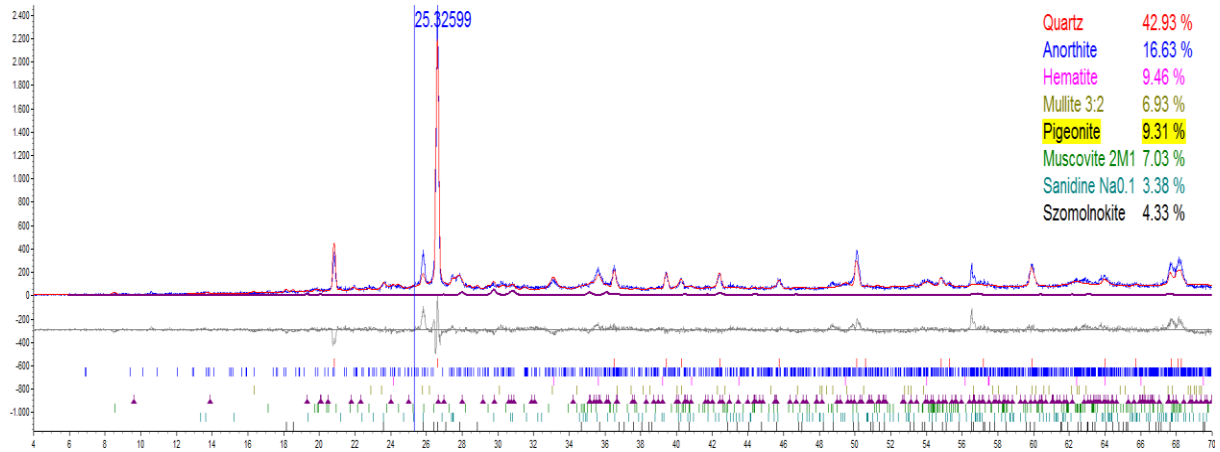
Sample 692



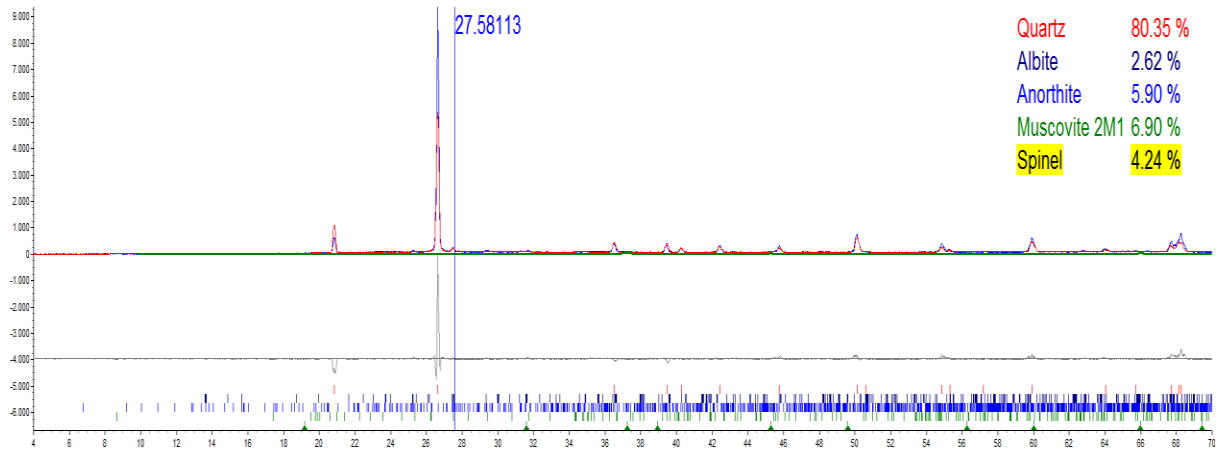
Sample 699



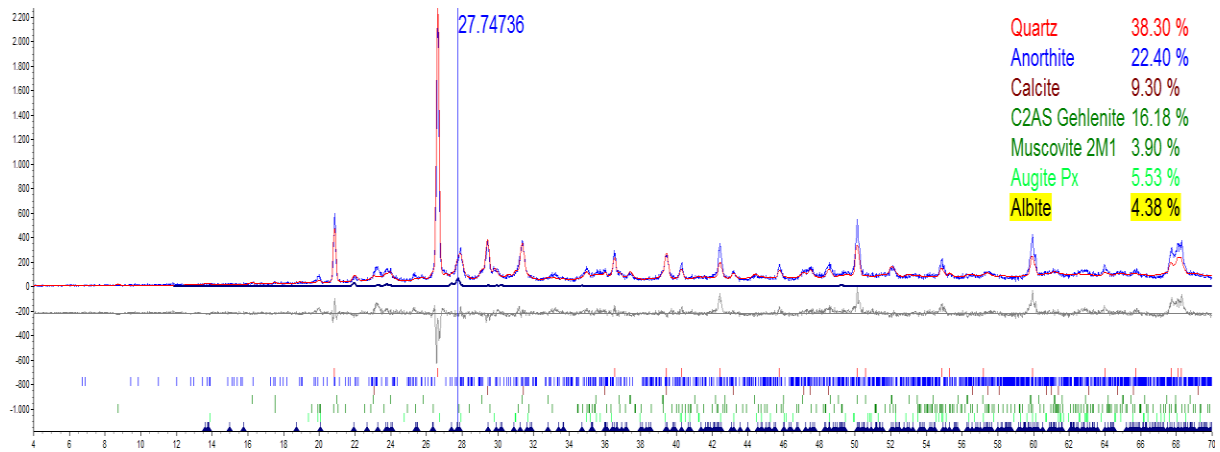
Sample 701



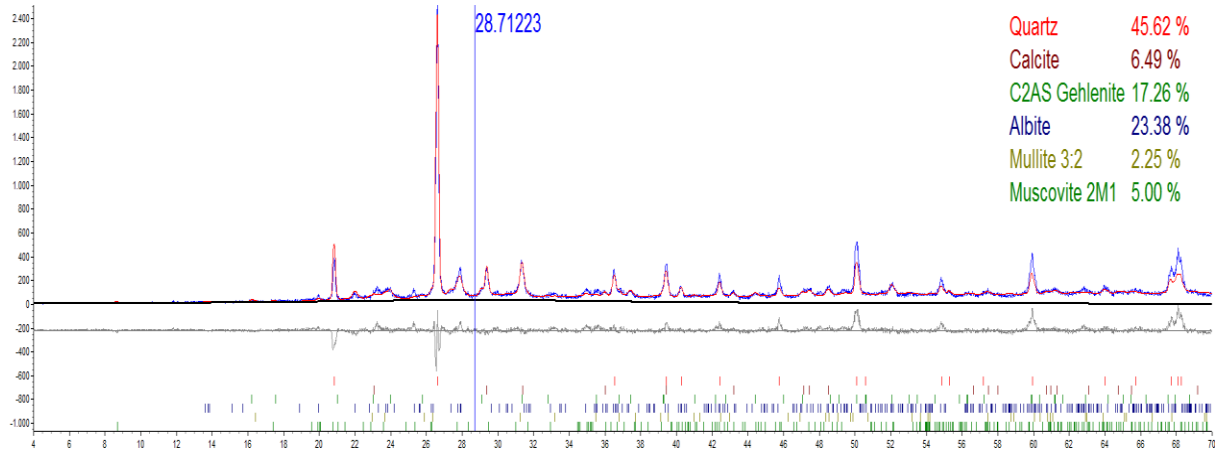
Sample 703



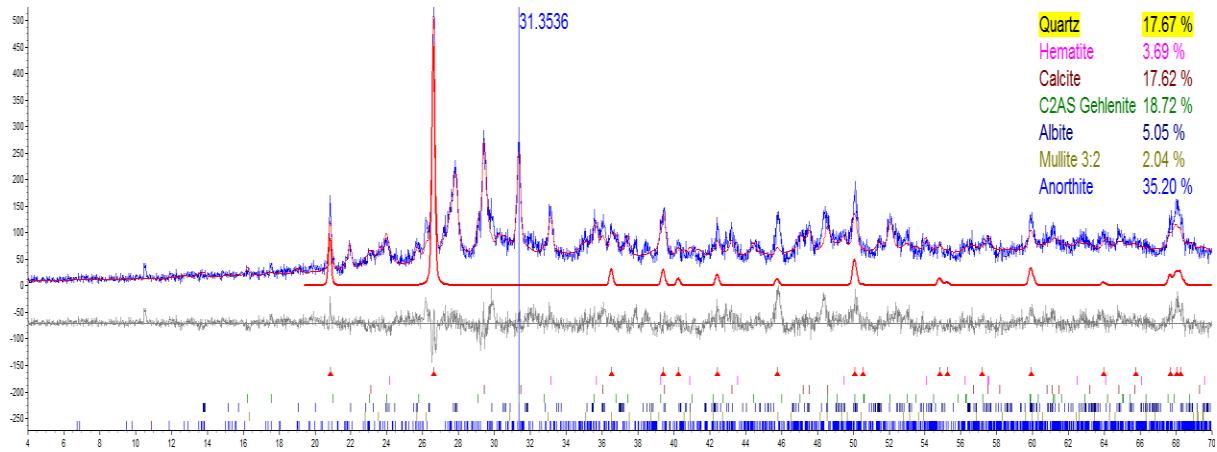
Sample 705



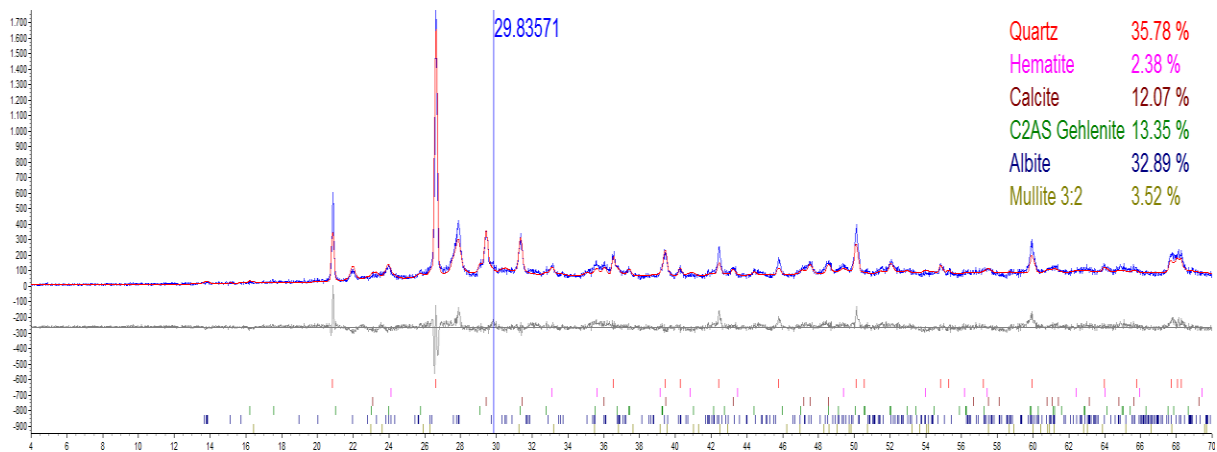
Sample 711



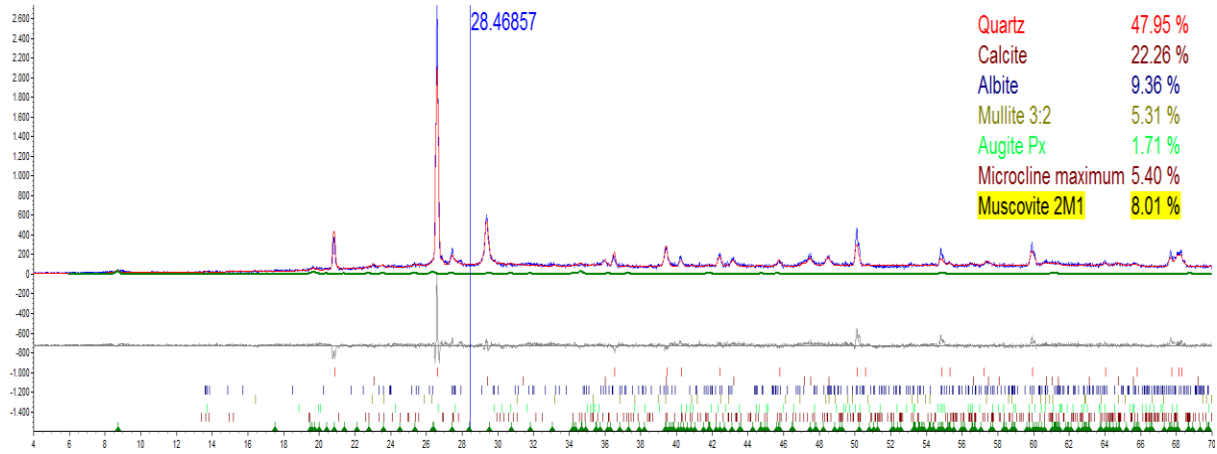
Sample 759



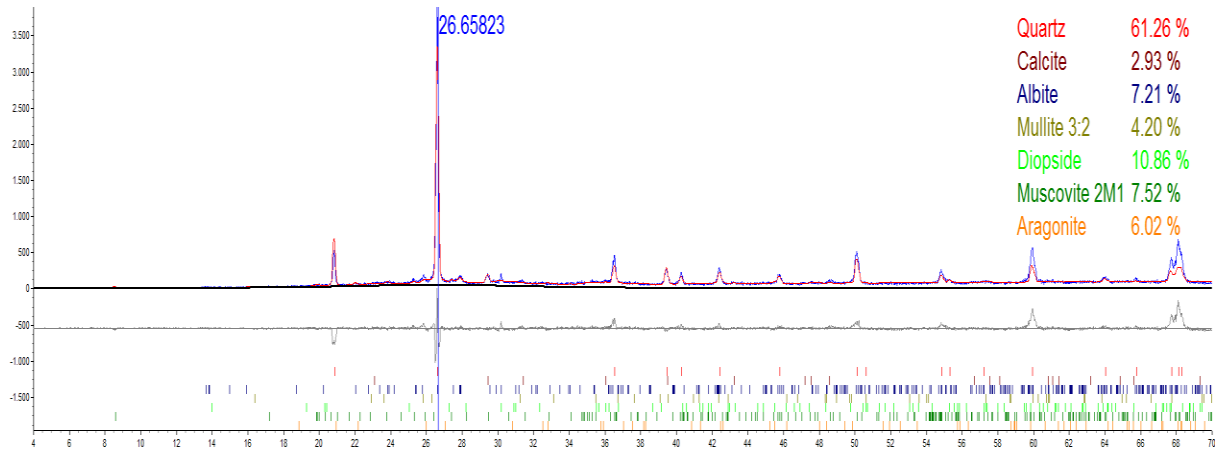
Sample 776



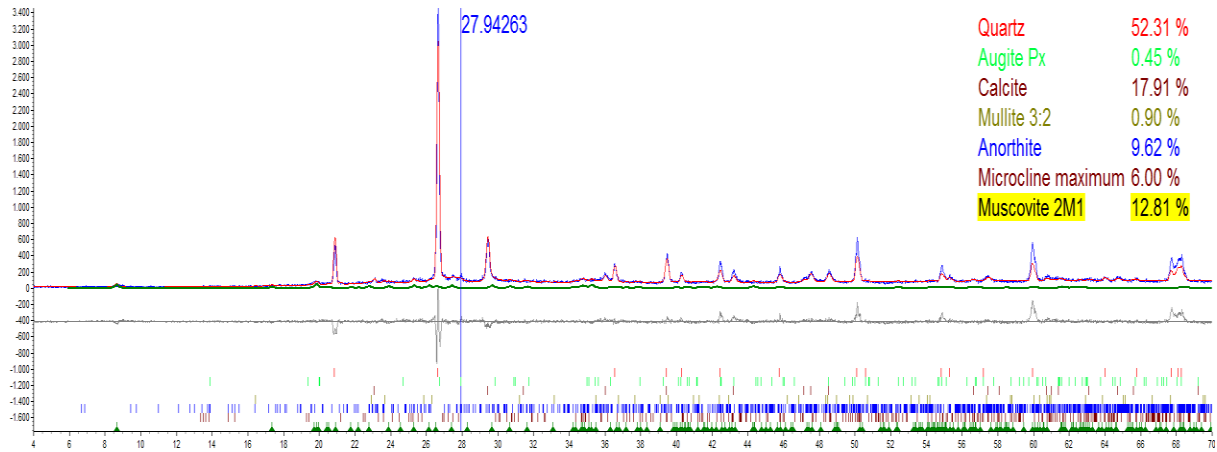
Sample 846



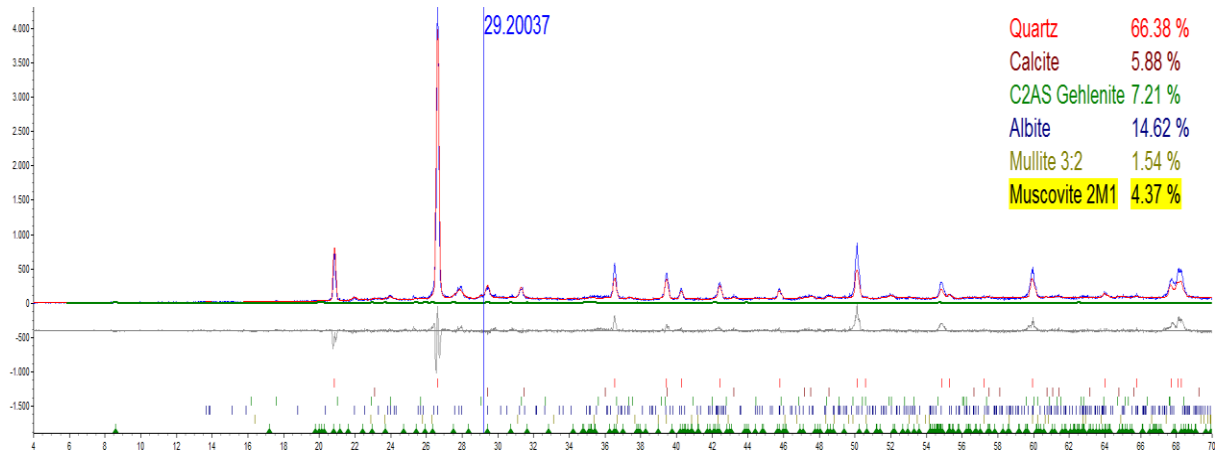
Sample 848



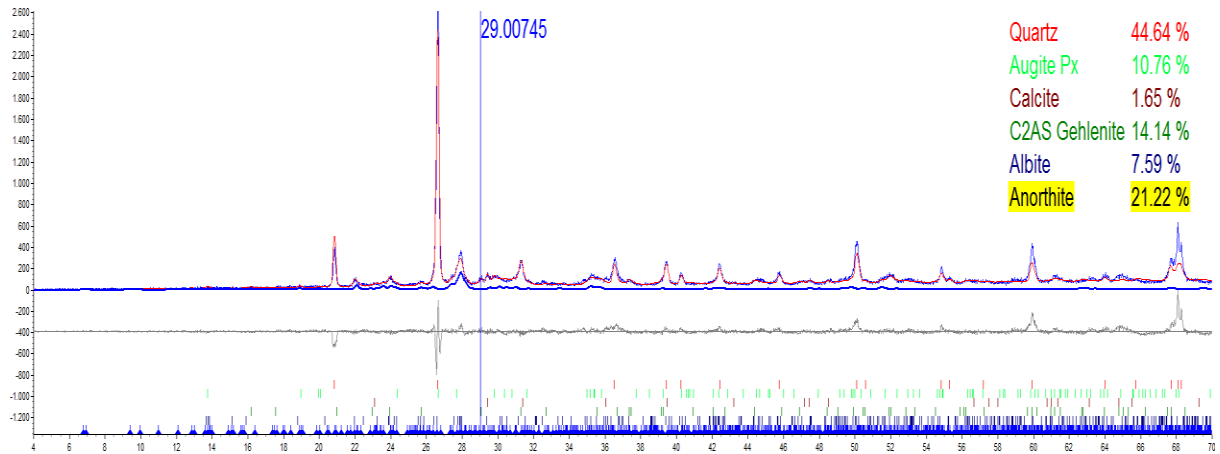
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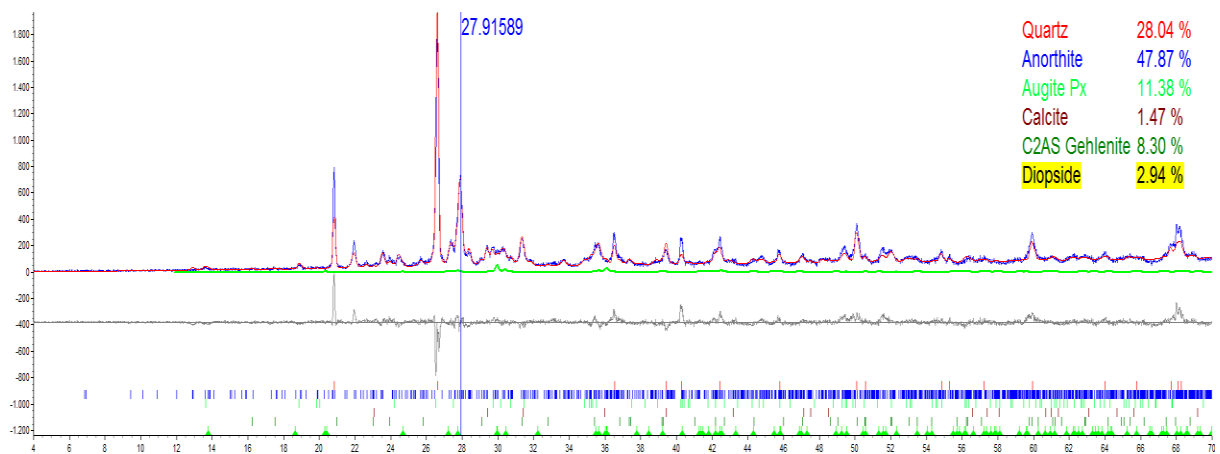
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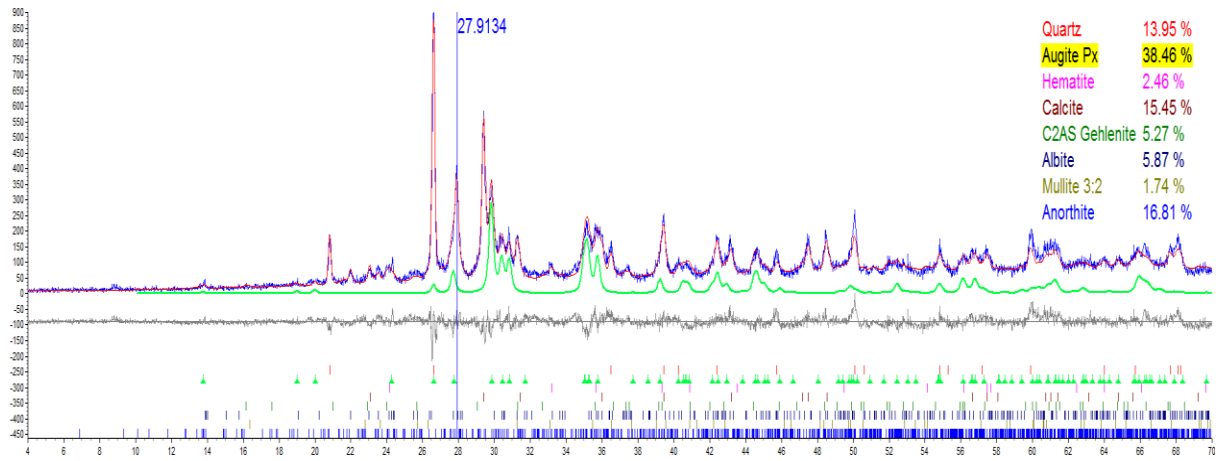
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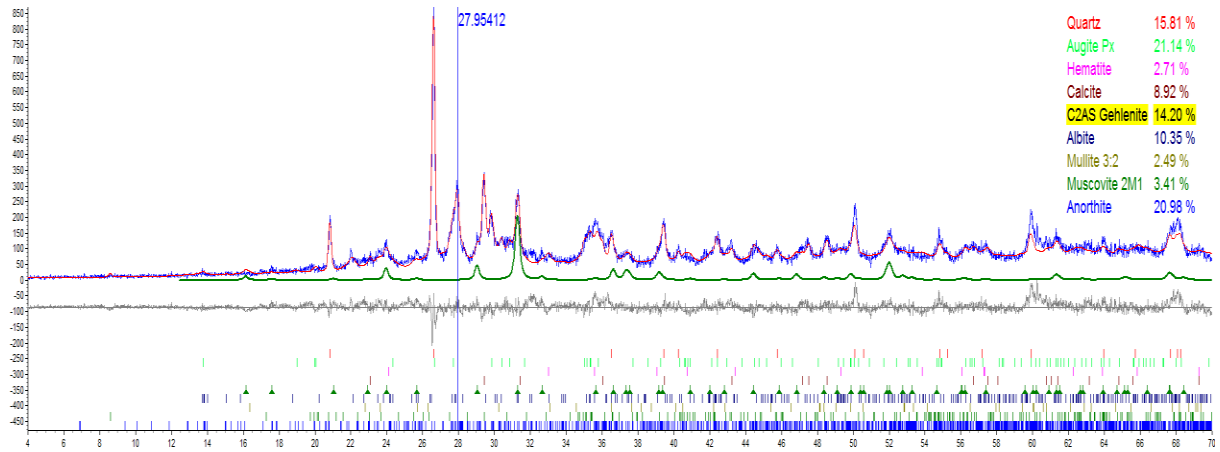
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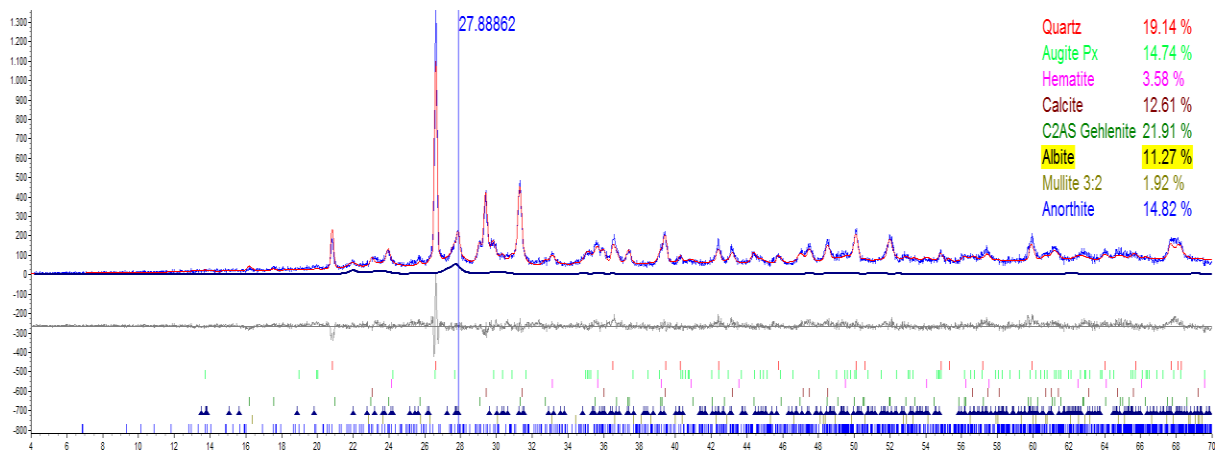
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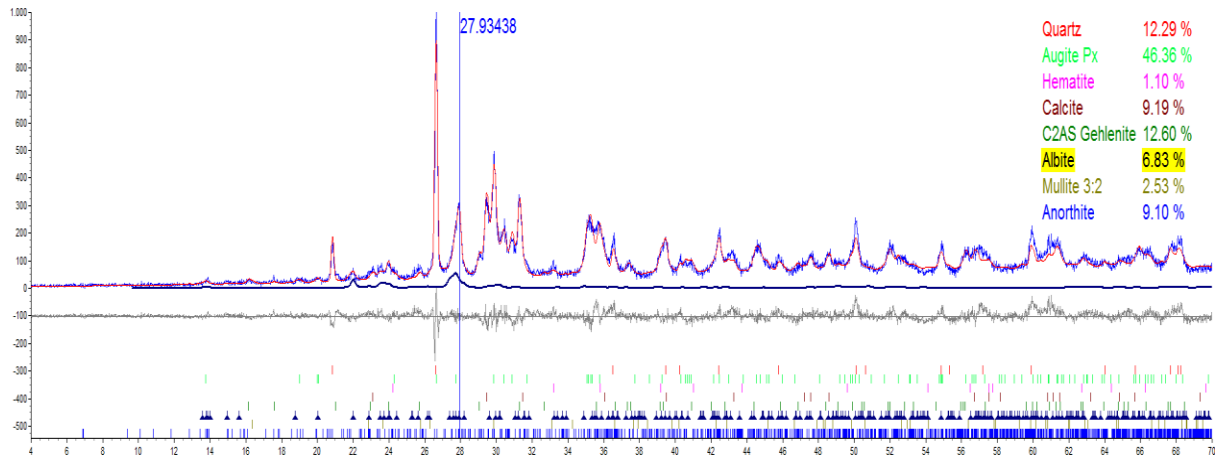
Sample 891



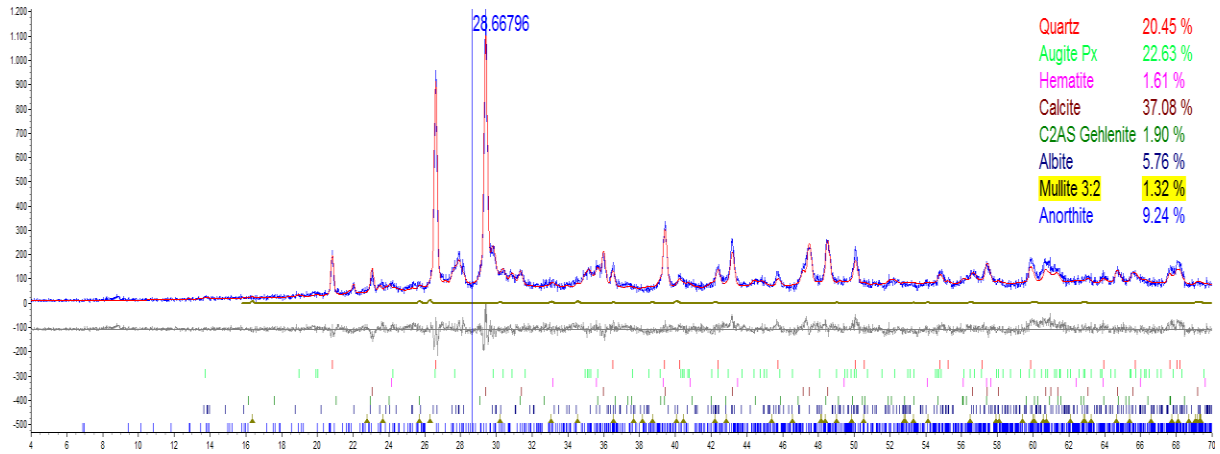
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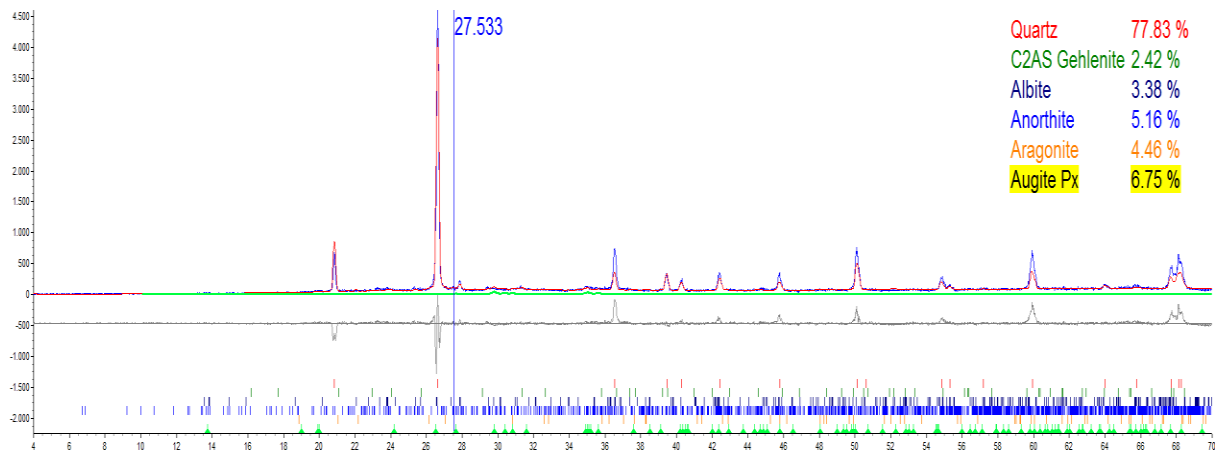
Sample 916



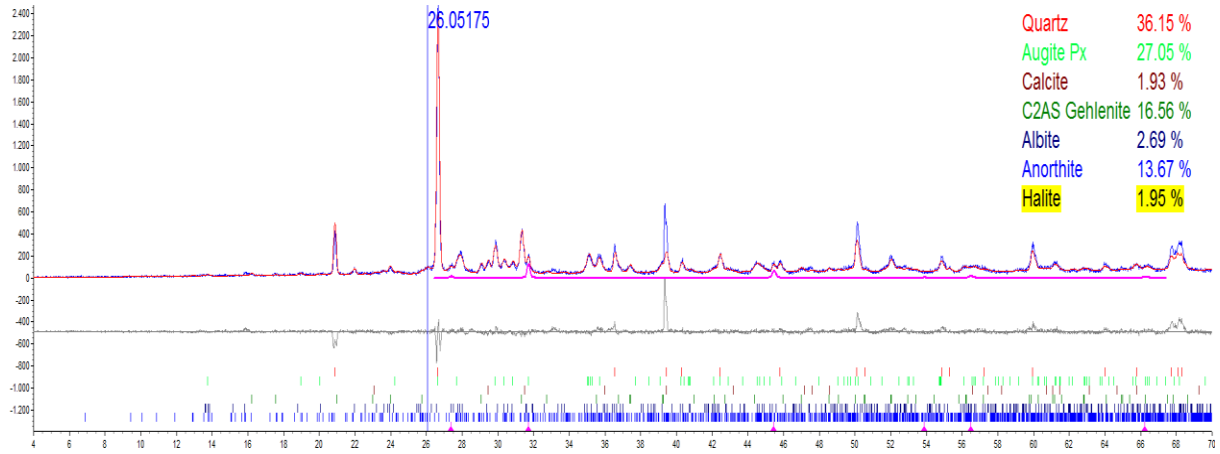
Sample 917



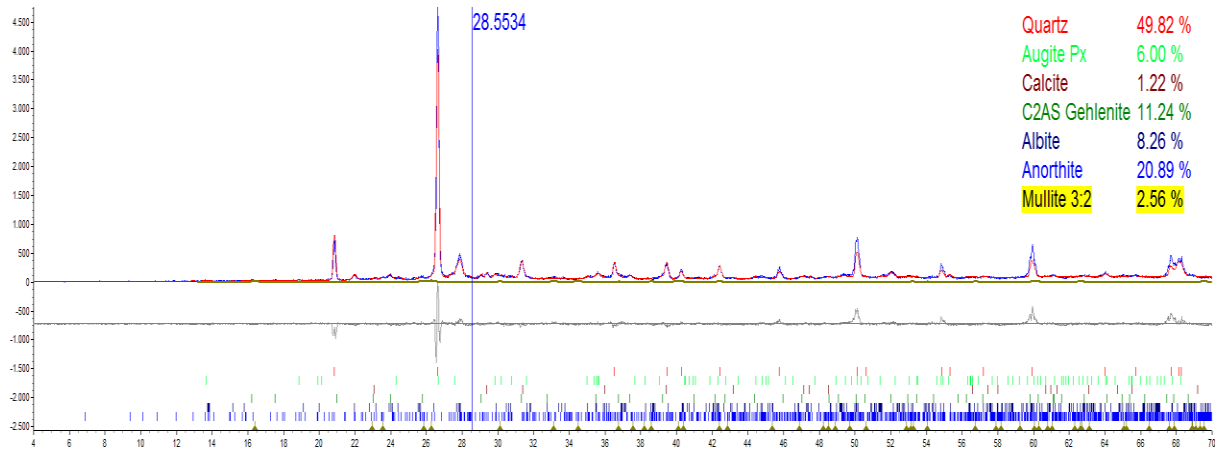
Sample 920



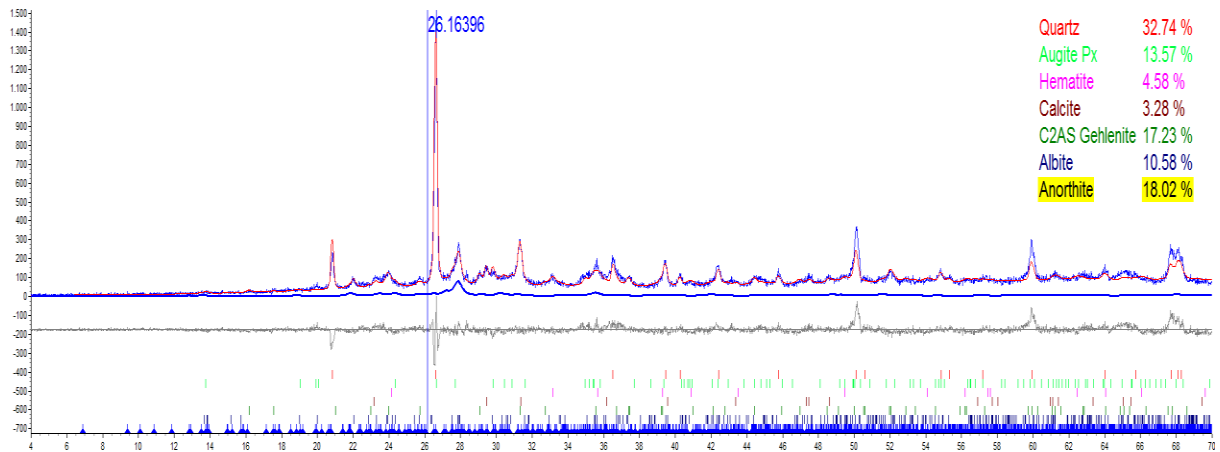
Sample 921



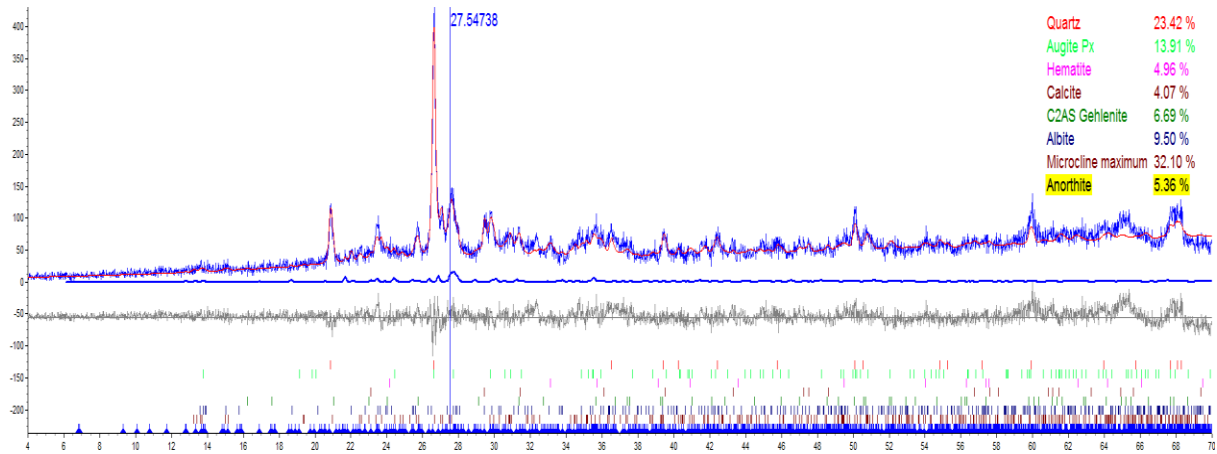
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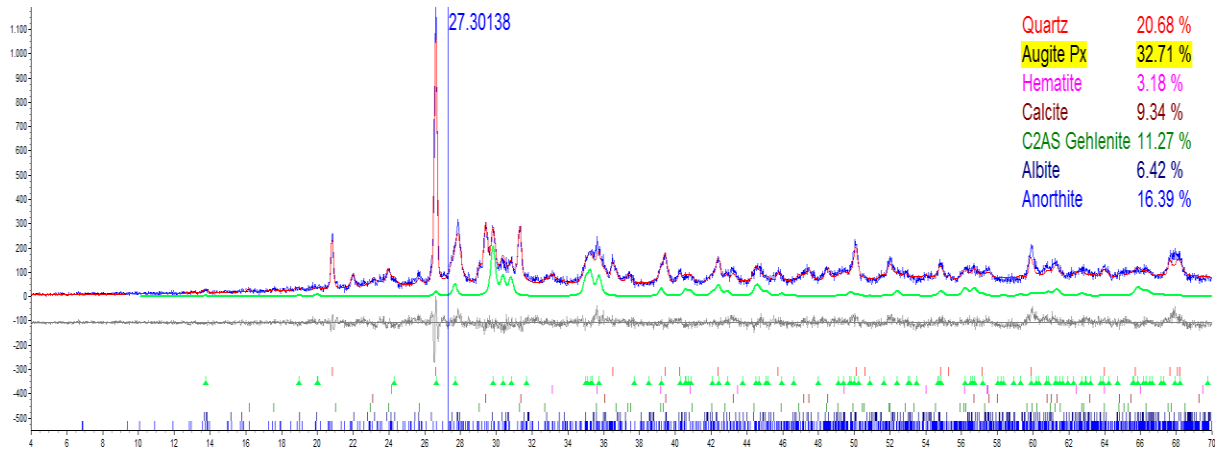
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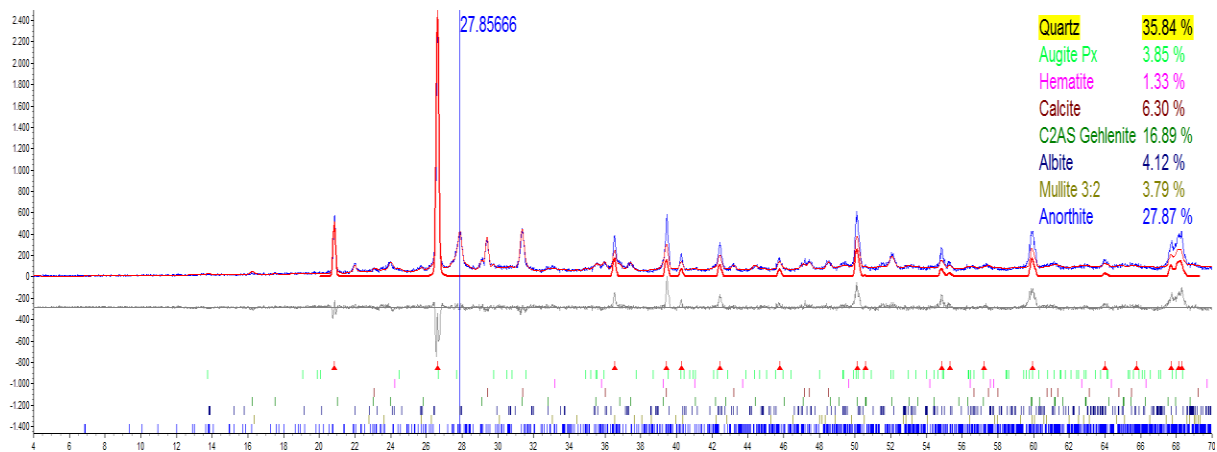
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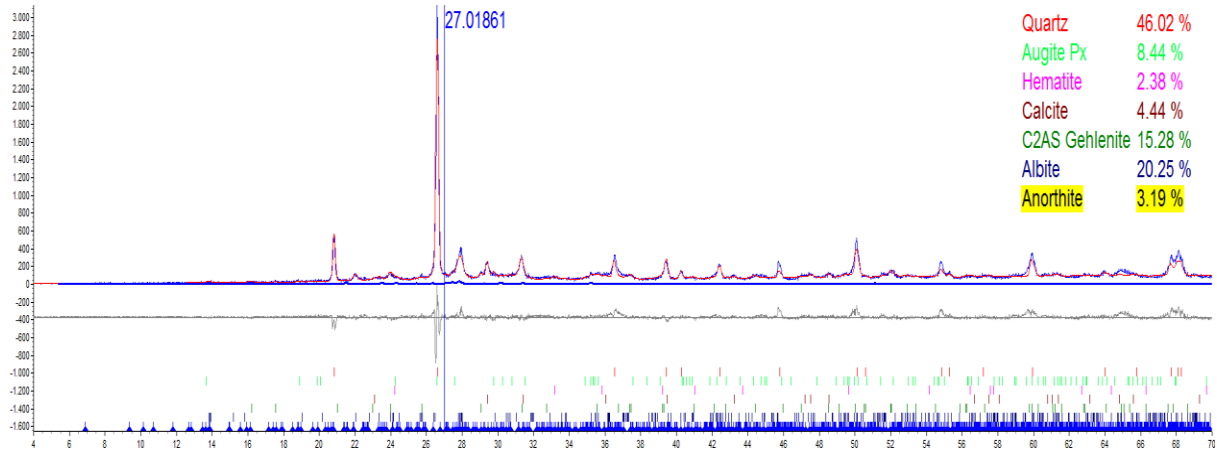
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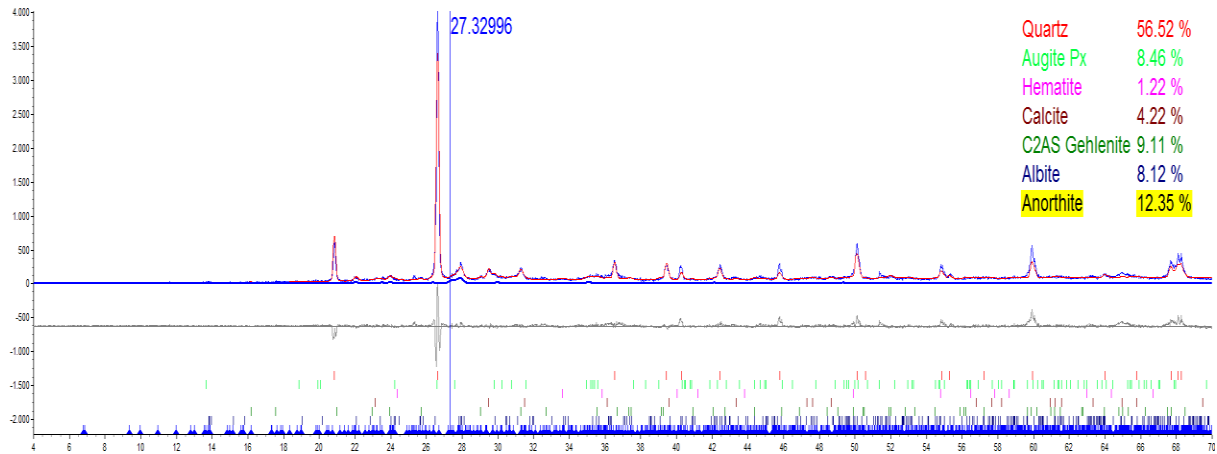
Sample 987



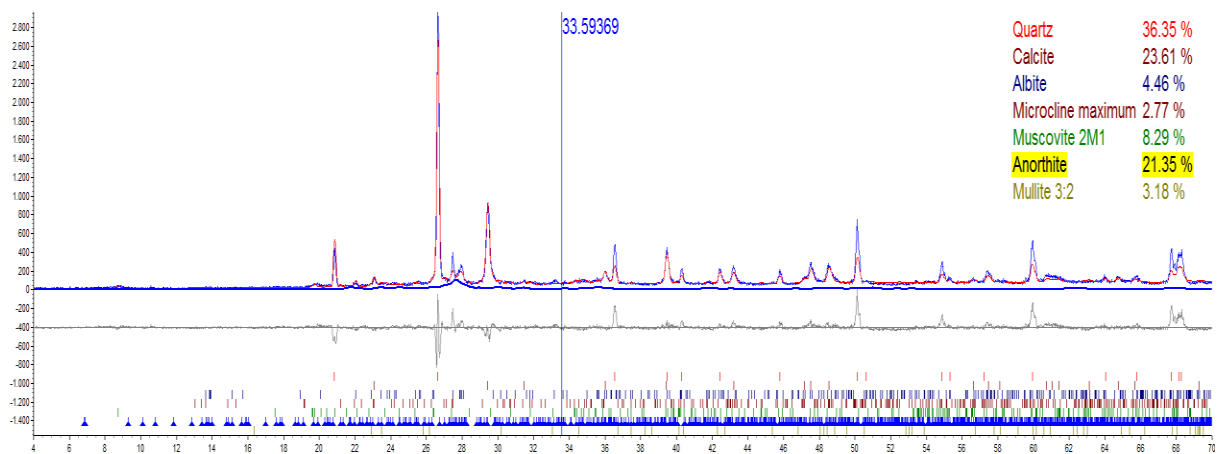
Sample 991



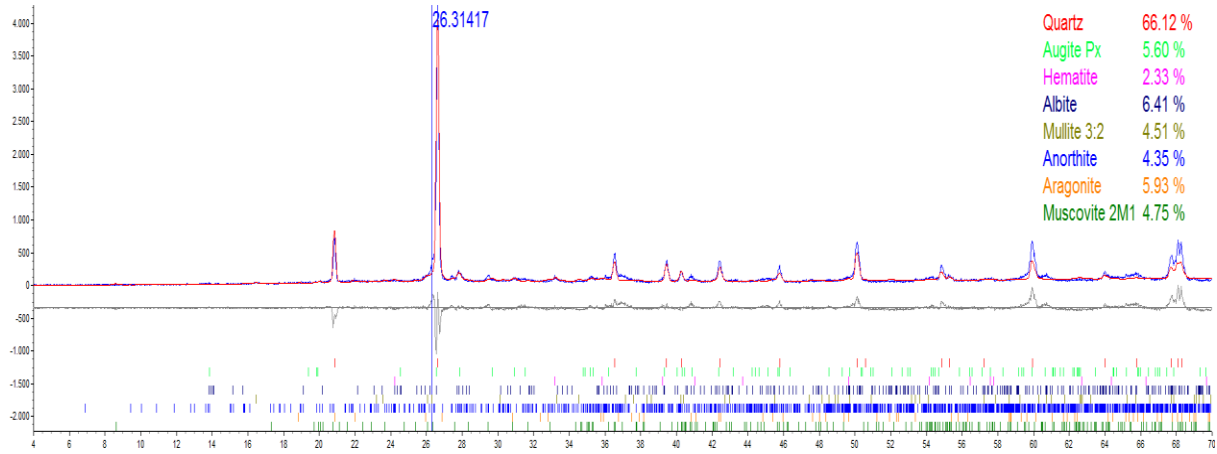
Sample 1001



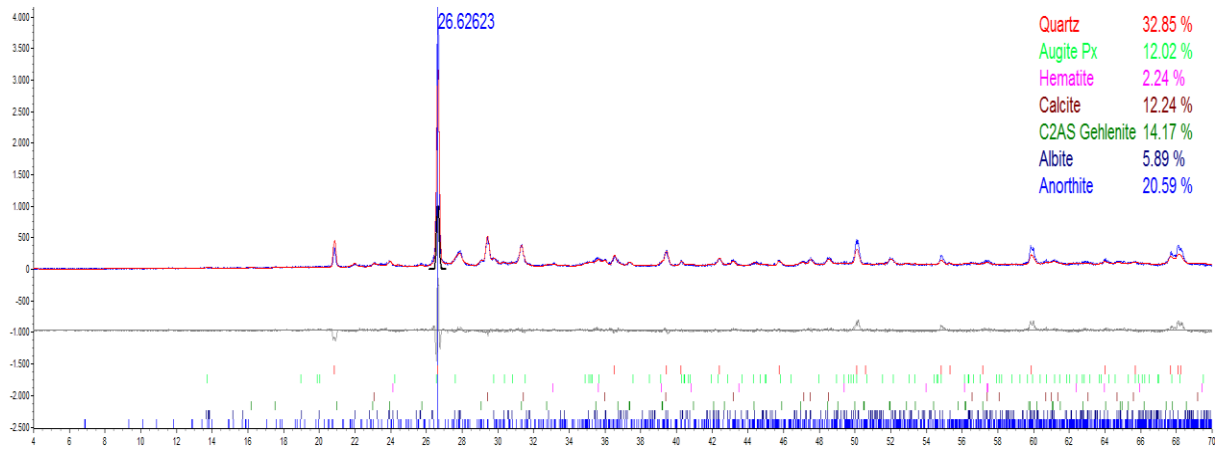
Sample 1009



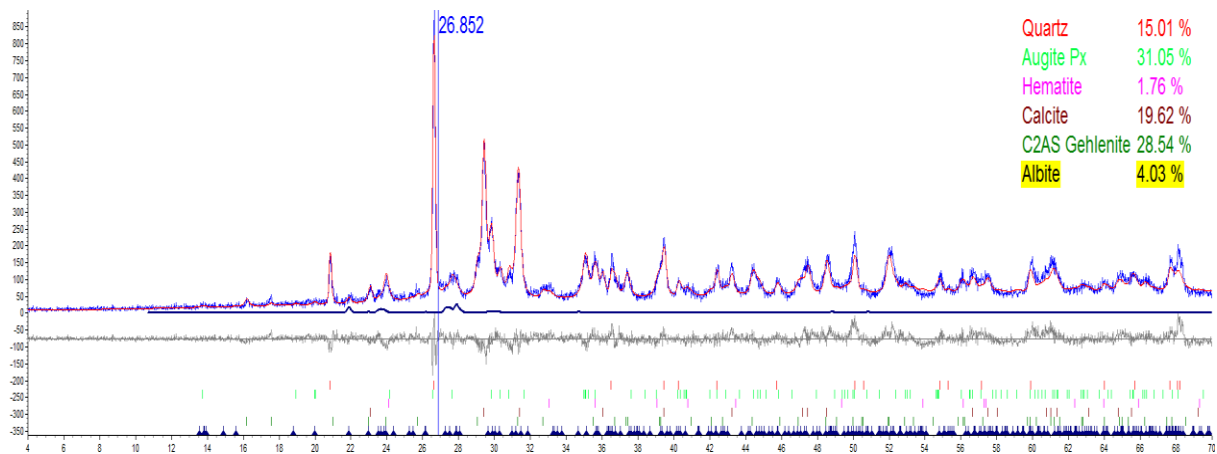
Sample 1023



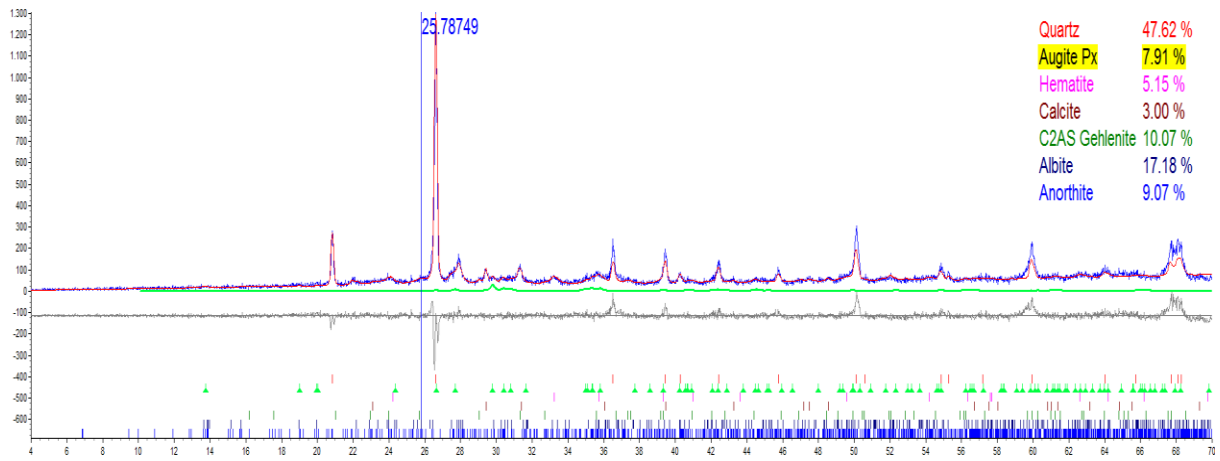
Sample 1024



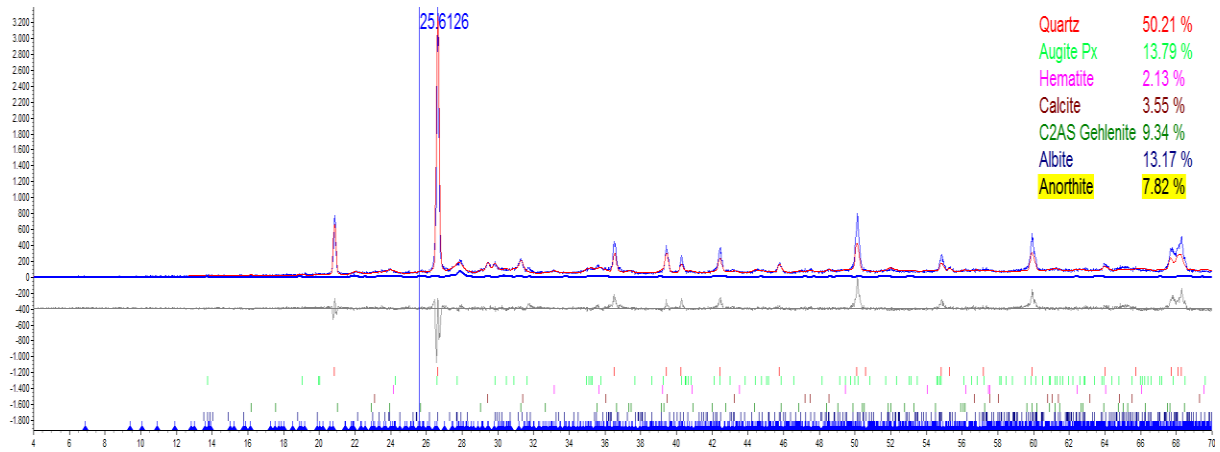
Sample 1093



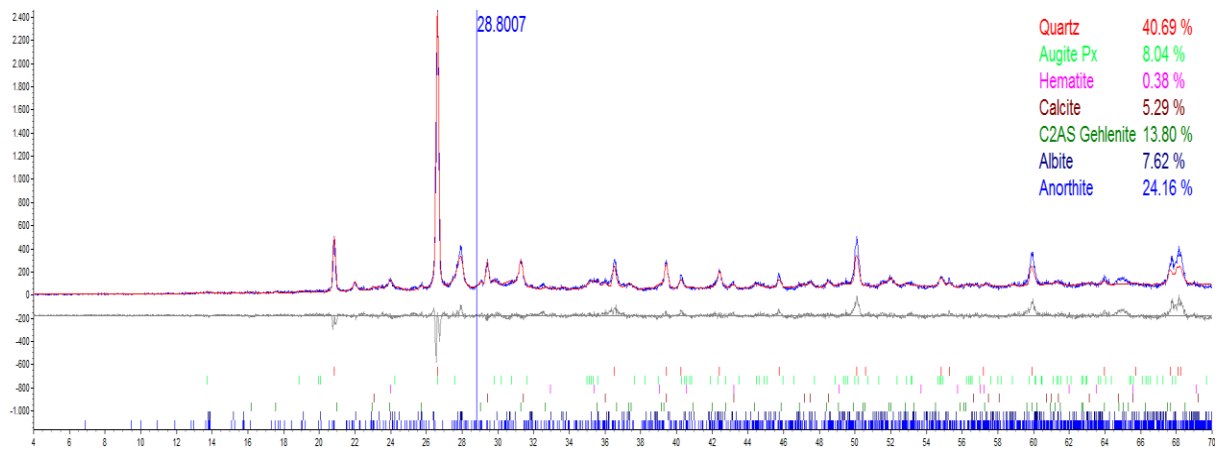
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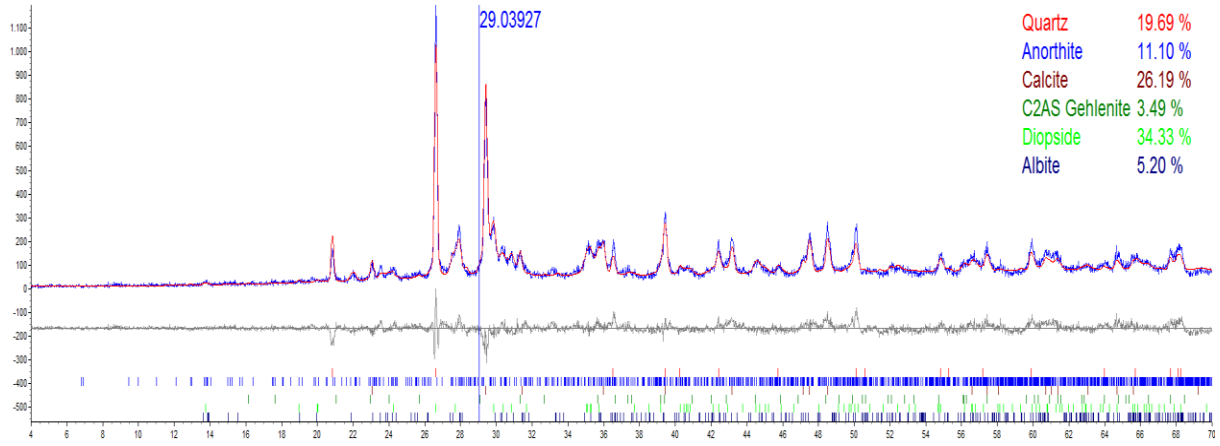
Sample 1111



Sample 1119



Sample 1128



Sample 1203

J: SEM / EDX results and photomicrographs.

J.1: The studied samples results by SEM / EDX

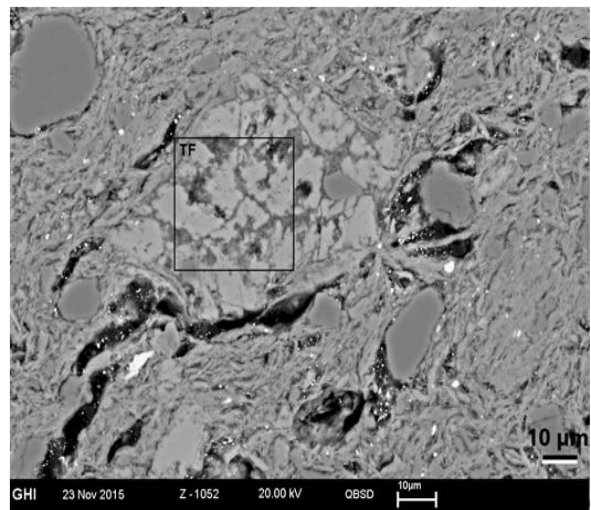
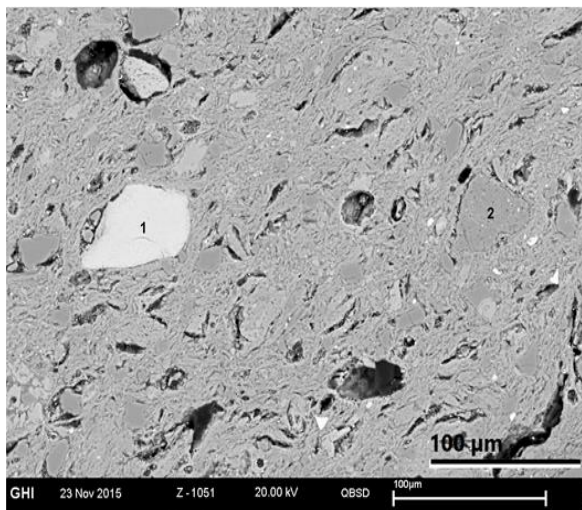
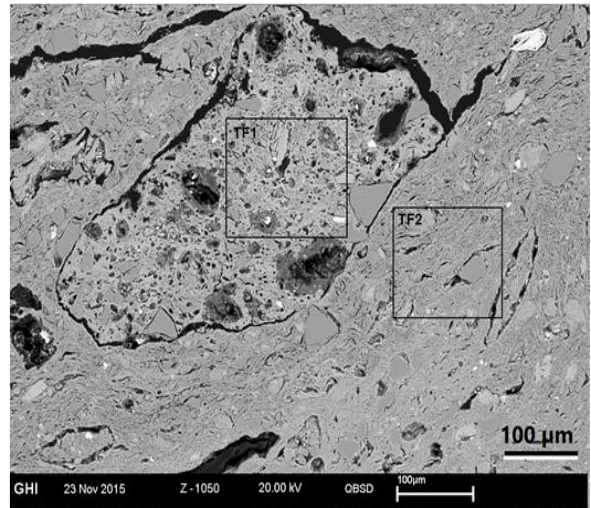
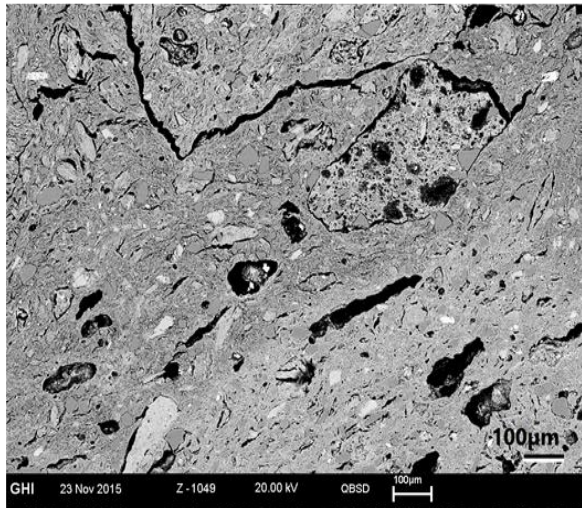
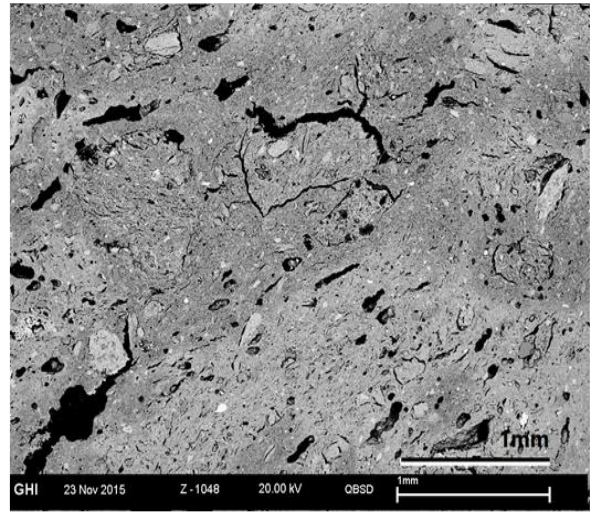
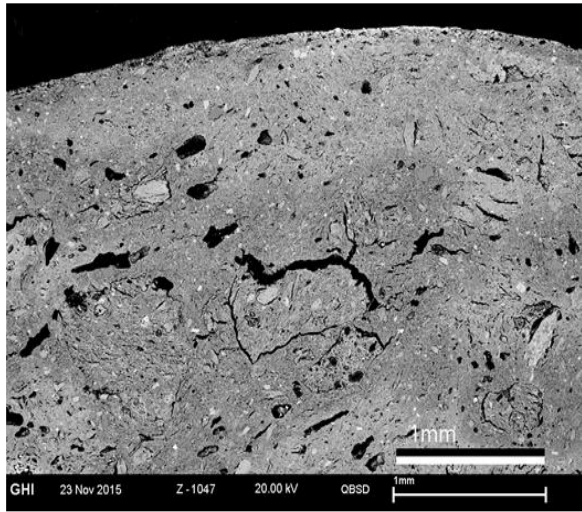
sample No.	SEM-Figs.	Qz [μm]	Matr [μm]	Porosity	Tempring	Additives	μ -struc.
AB285	Z-1087-1092	< 10 μm , 20-200 μm	< 10 μm , mullitic	< 10 μm , cracks, ruptures 200-500 μm	Quartz, Microcline 50 μm	Chamotte up to 500 μm	bimodal, homogen., not textured
AB350	Z-0999-1004	5-10 μm	5-10 μm	5-20 μm	none		homogeneous
AB291	Z-1093-1099	5-20 / 20-200	1-20 μm	1-20, >100	Quartz	Chamotte	strongly heterogen., textured
AB392	Z-1008-1011	5-20 / 50-200 μm	< 10 μm	> 100 cracks	Quartz, Forsterite, CaMgSi ₂ O ₆		bimodal, textured
AB451	Z-1081-1086	50-100 μm	5-10 μm	50-500 μm cracks	Calcite 200-500 μm	Albite 20-50 μm	bimodal, textured
AB510	none						
AB 483	Z-1065-1071	20-50 μm	< 10 μm	<10, 50-200 μm	Calcite 10-100 μm		broad distribution, untextured
AB 509	Z-1018-1025	<10, 50-200 μm	< 10 μm mullitic	10, 100-200 μm , carcks & rounded pores	Quartz	Limonite/ Hematite	
AB 522	Z-1012-1017	<10, 20-50 μm	<10 μm	<10, 50-1000 μm textured	none	none	extremely fine, homogeneous
AB 362	Z-1101-1105	20-70 μm	< 5 μm	<10, 50-100 μm	Plant fibres, Quartz	Micr, Alb, Plag	heterogen., little texture, hoop cracks around aggregates
UQ476	Z-0992-0998	< 10 μm	< 10 μm	<10, 50-100 μm	organ. Particles with Anorthite-FeOOH-shell, 50-200 μm		heterogen., little texture
UQ400	Z-1026-1033	<10-20 μm	<10 μm , gehlenitic, anorthitic	10-20, 50-100	none	none	homogeneous, few inclusions
UQ57	Z-1047-1052	20-100 μm	< 10 μm mullitic	>10, 200-1000 μm , cracks, elongated	An-Micr-Mul-Chamotte bis 1 mm	Quartz, Microcline, Kirschsteinite CaFeSi ₄ to 50 μm	heterogeneous, cracked
UQ165	Z-1053-1058	<10, 50-100, >200 μm	< 10 mullitic	< 10, 100-500 μm	Quartz > 200 μm	Chamotte 100 μm	homogen. bimodal, textured

UQ241	Z-1059-1064	< 5 µm bis 1,3 mm	< 5 µm, calcitic	< 5 - 300 µm	Quartz < 1 mm, Calcite 50-200 µm, recryst Dolomite 50 µm, Hematite 100 µm	mollusc shells	strongly heterogen., untextured
UQ120	Z-1112-1118	20-200 µm	<10 µm mullitic	< 20 µm, 50-100 µm	Quartz 100-200 µm	Onkoides/ Ovaloides 200-300 µm, Chamotte 200 µm	bimodal homogen., strongly textured
UQ183	Z-1034-1039	< 10, 20-30 µm	< 10 µm	5-10 µm round, 50-500 µm cracks	Plant fibres? 300-500 µm	Chamotte, Anorthite 100-200 µm	heterogen., cracks, untextured
UQ220	Z-0985-0990	200-500 µm	< 10 µm	<10, channels and cracks to 1 mm	Plant fibres 300-800 µm	Anorthite- /Anorthite- Gehlenite- Chamotte 300 µm	strongly heterogen., burn-out pores, cracks
UQ81	Z-1106-1111	<20, 100-300 µm	< 10 µm gehlenitic	10 µm round, 50-200 µm sharp edges	Quartz	Chamotte 100-300 µm	heterogeneous, textured
UQ185	Z-0981-0984, 0991	20-50 µm	< 5 µm calcitic, apatitic	< 5 - 500 µm	Calcite to 500 µm		strongly heterog, cracks around aggregates, untextured
UQ229	Z-1041-1046	20-100 µm	< 5 µm anorthitic	< 5 µm bis 1 mm, cracks	Seed capsules ?	Chamotte 100 µm quartzitic, anorthitic	strongly heterog., cracks around aggregates, little texture
UQ152	Z-1119-1124	10-20 / 50-400 µm	< 5 µm, mullitic	5-10 µm round, 50-100 µm cracks	Quartz, Onkoides, Microcline	Calcite	bimodal, homogen., little texture
UQ319	Z-1072-1080	< 10 µm, 20-50 µm	< 10 µm	5-10 µm, 100-300 µm	Calcite 100 µm		homogeneous, textured, hematite-inclusions
UJ579	Z-1337-1345	< 5 µm, 50-100 µm	< 5 µm, glassy, CAS2	< 10 µm		Quartz sand 50-100 µm, lime	
UJ634	Z-1327-1336	10-20 µm, 50-200 µm homogen.	< 10 µm	< 5 µm, 50-800 µm	single inclusions of chamotte	Quartz sand < 800 µm	Texture, homogen., no cracks

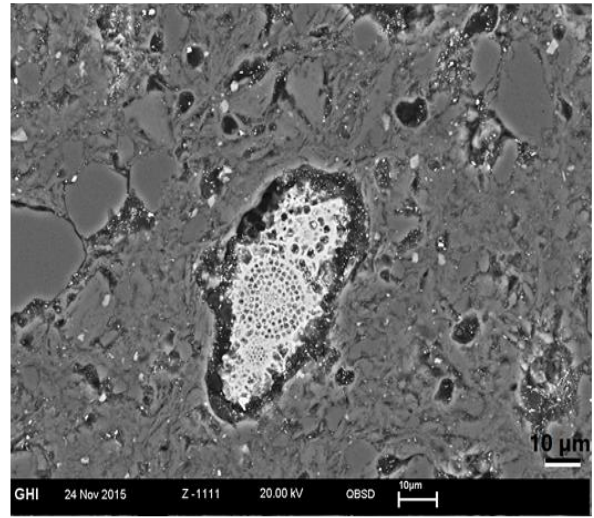
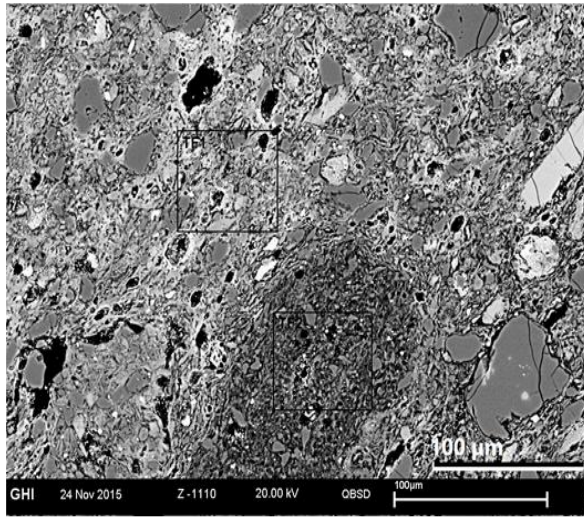
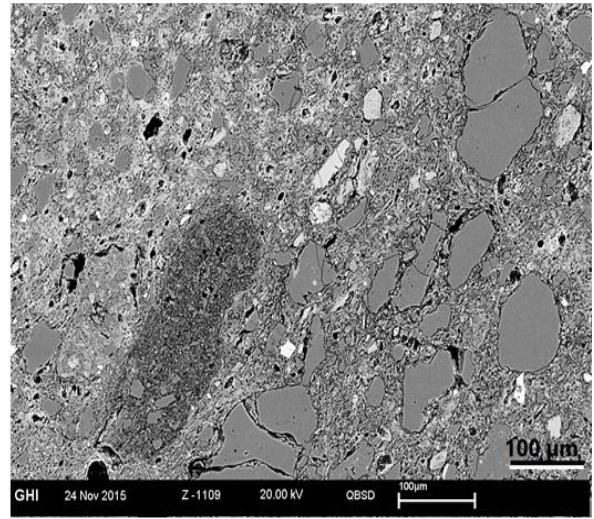
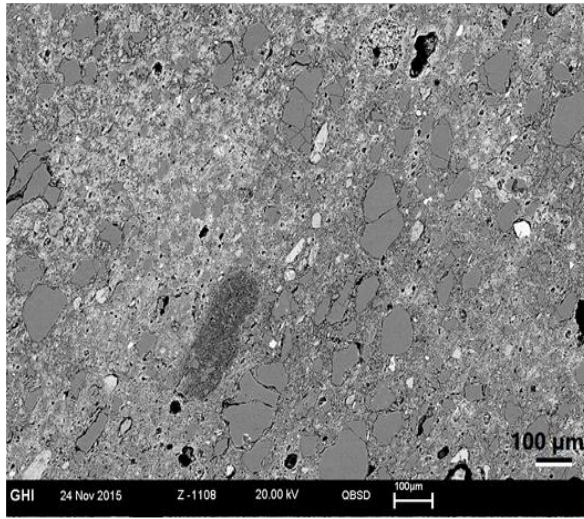
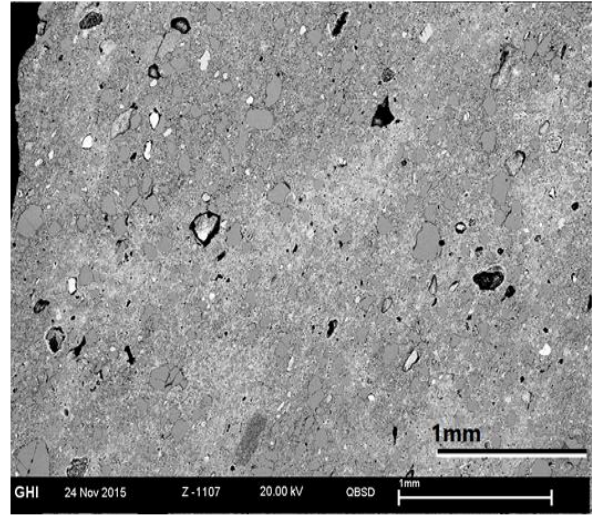
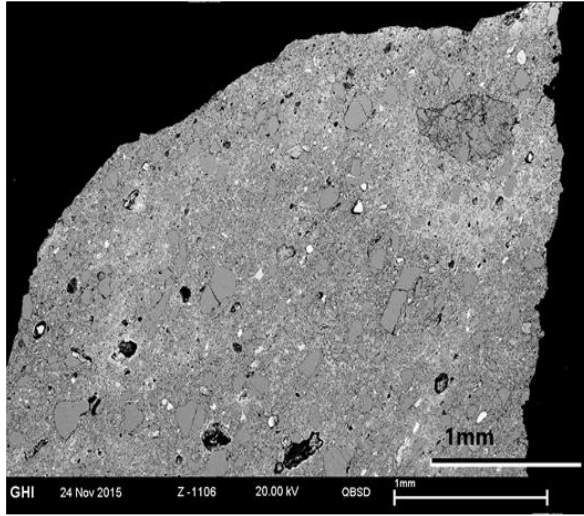
UJ859	Z-1399-1404	50-200 µm, inhomog., fragmented	5-30 µm, anorthitic	5-30 µm, cracks up to 100 µm	mullitic chamotte, 100-500 µm, rare calcite 500 µm	Quartz sand 50-200 µm	cracks, little texture
UJ931	Z-1354-1360		reamy 5-10 µm, from Kaolinite/Illite?		chamotte, perlite-grains 10-100 µm	Quartz sand, chamotte	homogen., little cracks, weakly textured
UJ1041	Z-1309-1317		glassy, < 10 µm	< 10 µm, > 100 µm	organic compounds, pyrolysed, burnt-off	Feldspars, Quartz, Lapillies	Texture, cracks
UJ1053	Z-1346-1353	20-100 µm, 50-200 µm	< 10 µm, tabular, mullitic	5-10 µm, elongated: 100-200 µm	none	Quartz sand, orthoclase	Texture, cracks, finegrained homogeneous
UJ1064	Z-1372-1378, 1426-1431	5-10 µm, 50-300 µm	< 10 µm	< 5-10 µm, 10-100 µm	#	Lime, chamotte of same materials: C2S-Fe-silicate-bonded quartz grains	no texture, heterogeneous
UJ98	Z-1388-1397	50-300 µm	Quartz 5-20 µm, lime-rich bonding	textured cracks 10-1000 µm, Matrix 5-10 µm	potash feldspars up to 1mm, Quartz sand 50-300 µm	none	little texture, cracks
UJ691	Z-1318-1326	5-50 µm, 50-300 µm	< 10 µm, glassy	> 100 µm, 20-50µm	none	molten feldspars?	Texture with layered cracks
UJ795	Z-1413-1420	5-20 µm, 50-300 µm	< 19 µm, mullitic	5-20 µm, 100-200 µm	none, only inclusions of anorthite, calcite, limonite 50-200 µm	none	weakly textured cracks and pores
UJ978	Z-1405-1412	5-10 µm, 50-200 µm	2-10 µm, lime-rich, illitic	5-20 µm, 100-300 µm	none, only inclusions of apatite, anorthite, mullitic chamotte 100 µm	none intentionally added	weakly textured cracks and pores, heterogeneous
UJ26	Z-1421-1425	5-20 µm, 10-150 µm	2-10 µm, lime-rich, illitic	5-100 µm, homogeneous	none	none intentionally added, rare lime-chamotte	very homogeneous, no texture
UJ1090	Z-1440-1448	5-10 µm, 50-300 µm, well rounded	2-10 µm, lime-rich, illitic	5-10 µm, 20-100 µm	none	none	weakly textured, hoop

							cracks
UJ148	Z-1361-1371	10-50 µm, 50-200 µm	< 10 µm, lime-rich	< 5 µm, 5-10 µm, 20-100 µm elongated	rare SiO ₂ -chamotte	none	weakly textured, homogeneous grain size
UJ144	Z-1449-1458	2-20 µm, 50-150 µm, sharp edges	< 10 µm, lime-iron slag	1-10 µm, 100-500 µm	none	slags, lime-soda-feldspars 50-200 µm	weakly textured (cracks), locally heterogeneous
UJ150	Z-1300-1308	5-10 µm, 20-50 µm, >100 µm	< 10 µm, glassy	5-20 µm, 50-100 µm	rare quartz, 300-1000 µm	none	bimodal, homogeneous, textured cracks
UJ173	Z-1432-1439	20-50 µm, narrow distribtn.	5-20 µm, Fe-alumosilicatic	10-100 µm, shear cracks, shrinkage cracks	none	Slag minerals 10 µm - 1 mm	textured shrinkage cracks
UJ859	Z-1399-1404	50-200 µm, inhomog., fragmented	5-30 µm, anorthitic	5-30 µm, cracks up to 100 µm	mullitic chamotte, 100-500 µm, rare calcite 500 µm	Quartz sand 50-200 µm	cracks, weakly textured
UJ931	Z-1354-1360		reamy 5-10 µm, from Kaolinite/Illite?		chamotte, Perlite-grains 10-100 µm	Quartz sand, chamotte	homogeneous, less Risse, weakly textured
UJ1041	Z-1309-1317		glassy, < 10 µm	< 10 µm, > 100 µm	organic compounds, burnt-off	Feldspars, Quartz, Lapillies?	Texture, cracks
UJ1053	Z-1346-1353	20-100 µm, 50-200 µm	< 10 µm, tabular, mullitic	5-10 µm, elongated: 100-200 µm	none	Quartzs and, orthoclase	Texture, cracks, fine grained homogeneous
UJ1064	Z-1372-1378, 1426-1431	5-10 µm, 50-300 µm	< 10 µm	< 5-10 µm, 10-100 µm	Aggregates with hoop cracks 100-200 µm	Lime, chamotte of same material: C ₂ S-Fe-silicate-bonded quartz grains	no texture, heterogeneous
UJ98	Z-1388-1397	50-300 µm	Quartz 5-20 µm, lime-rich bonding	textured cracks 10-1000 µm, Matrix 5-10 µm	potash feldspars up to 1mm, quartz sand 50-300 µm	none	weakly textured, cracks

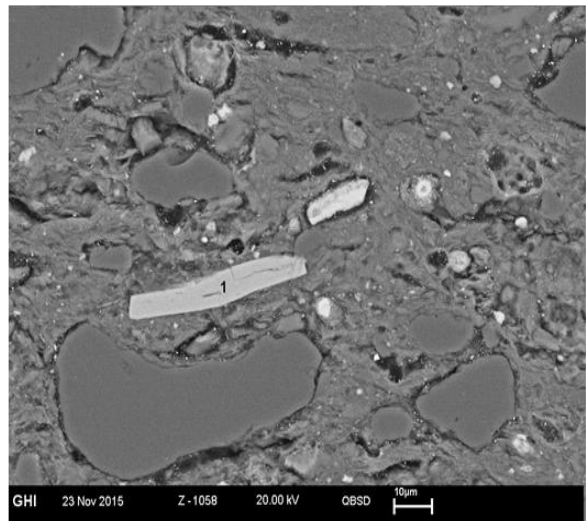
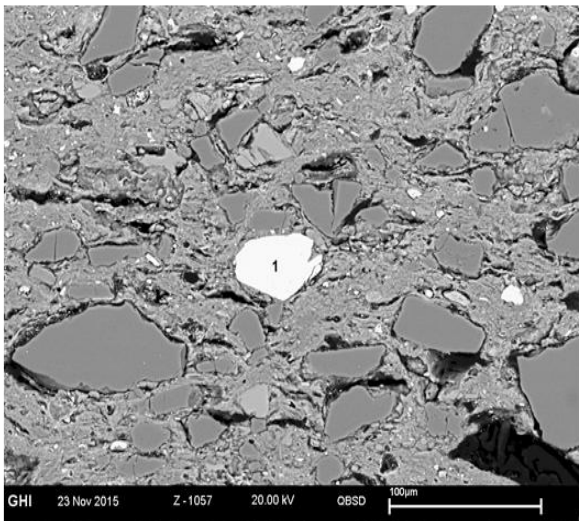
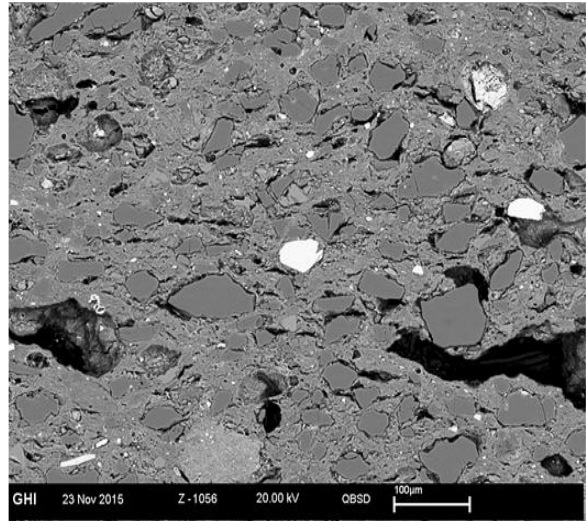
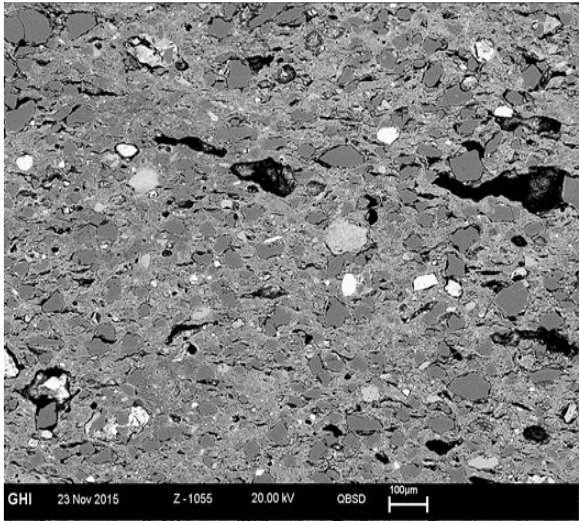
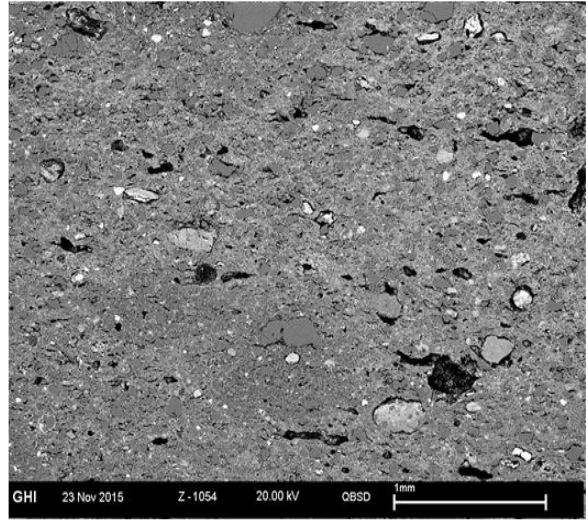
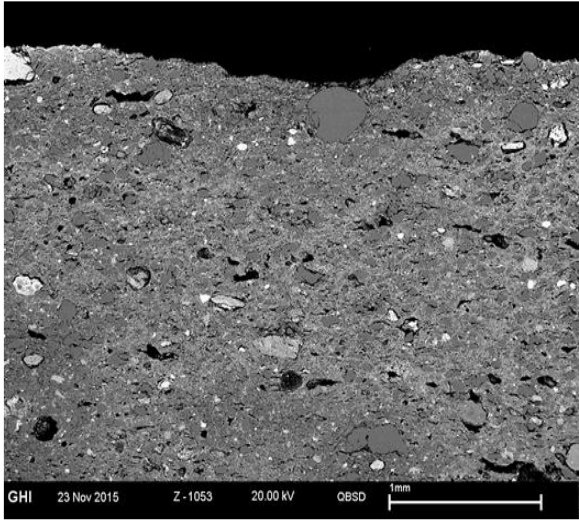
J.3: SEM photomicrographs of the studied samples.



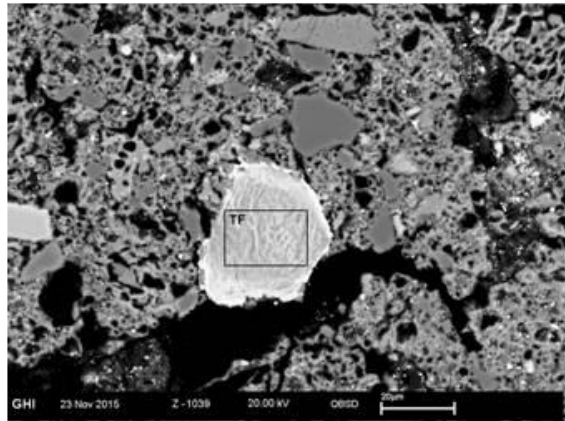
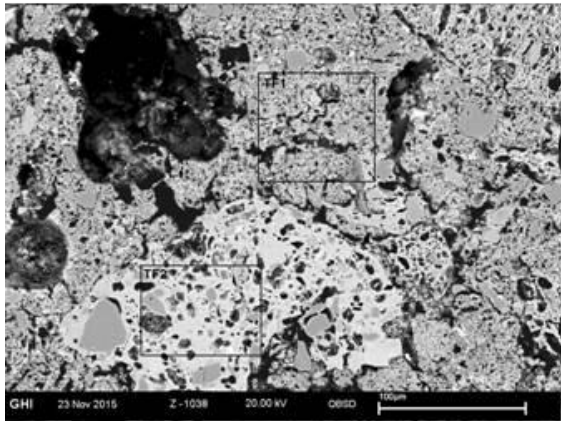
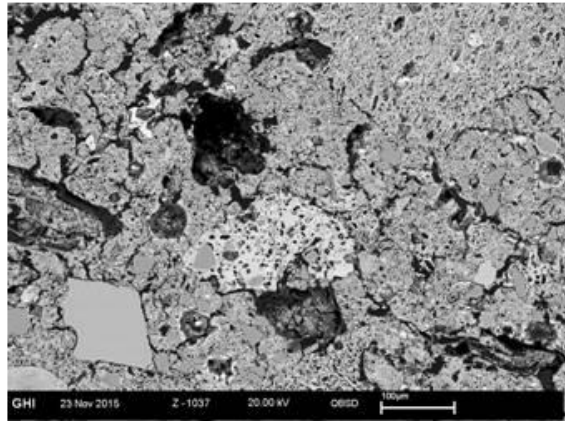
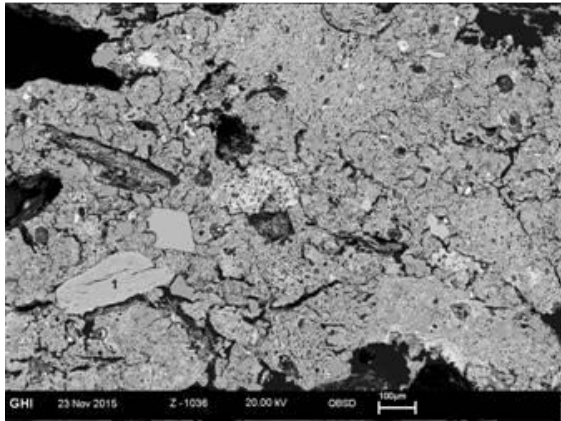
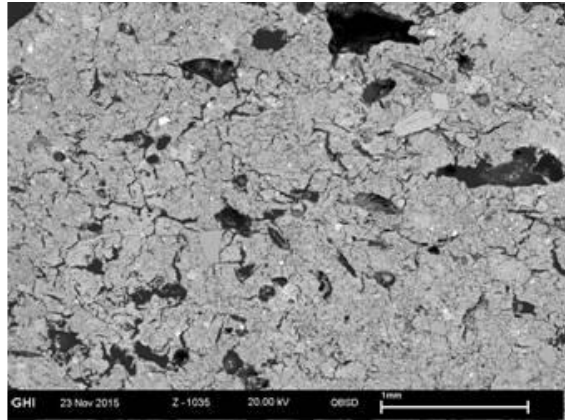
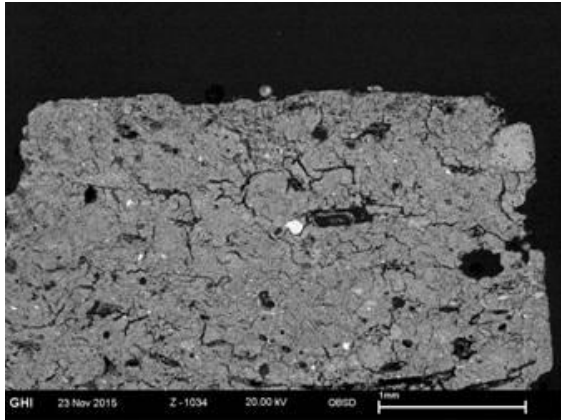
Sample UQ57



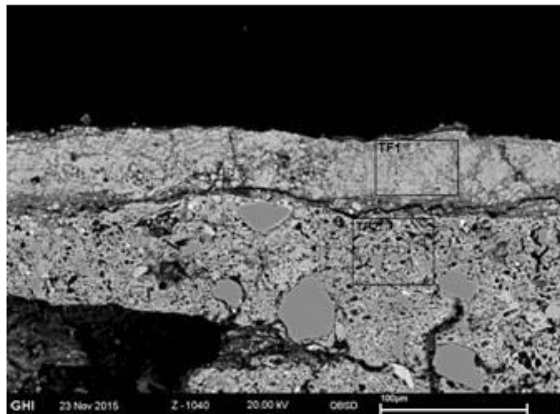
Sample UQ81

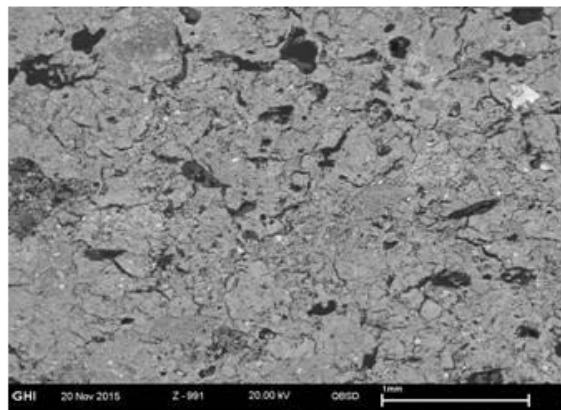
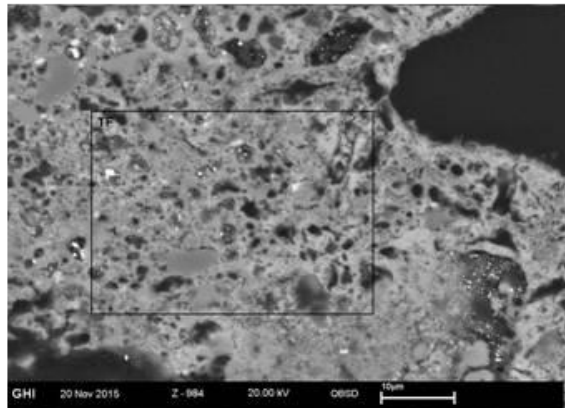
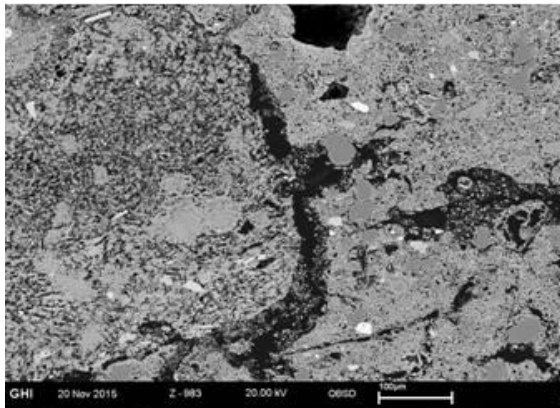
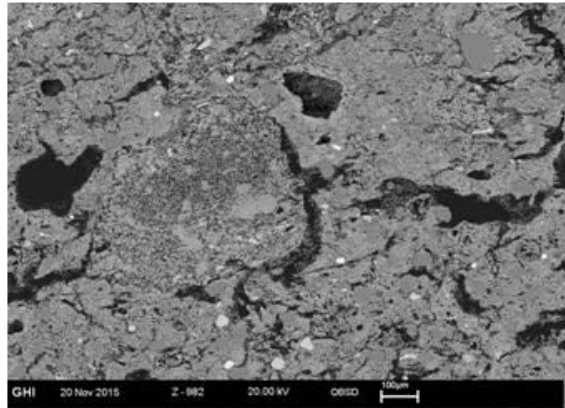
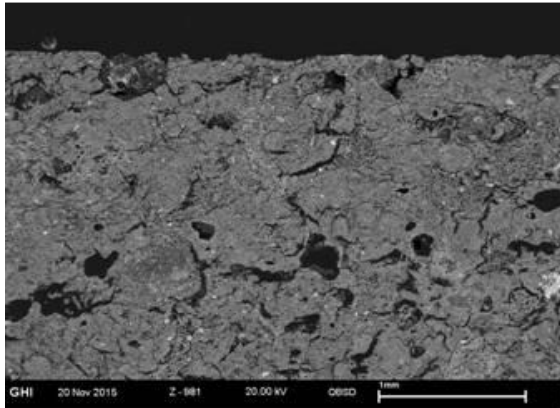


Sample UQ165

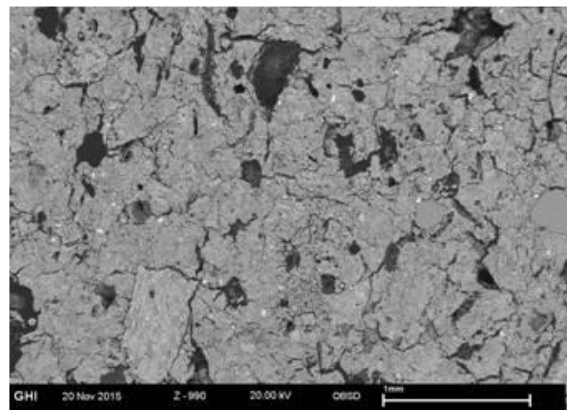
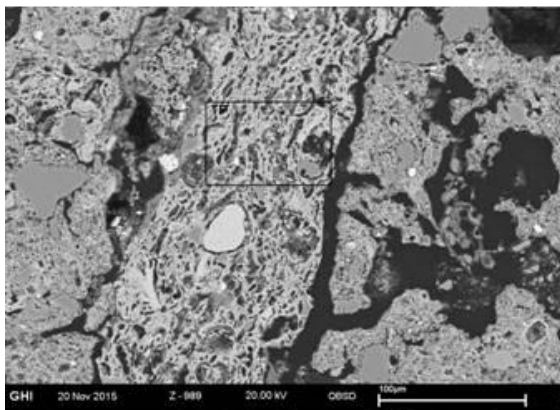
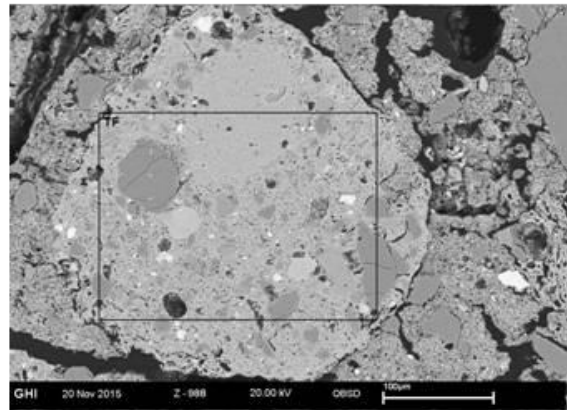
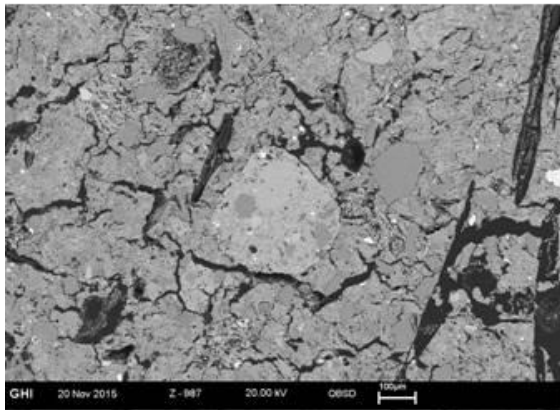
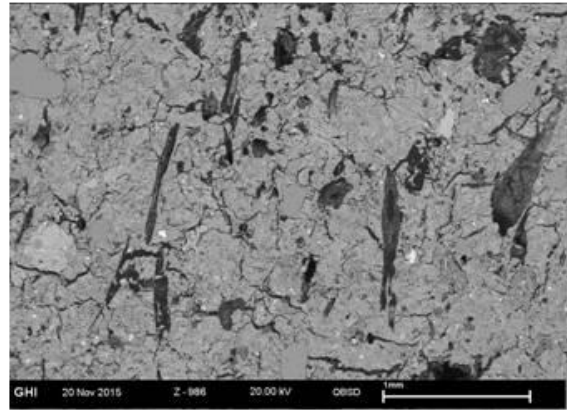
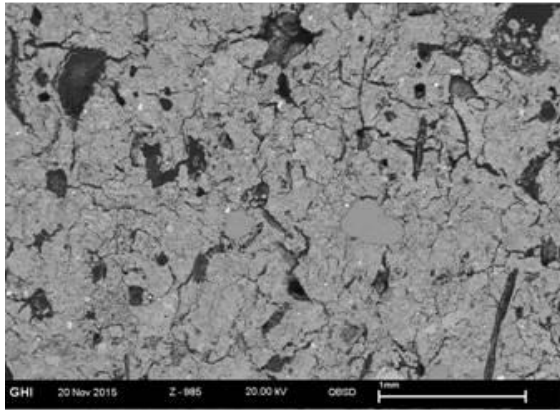


Sample UQ183

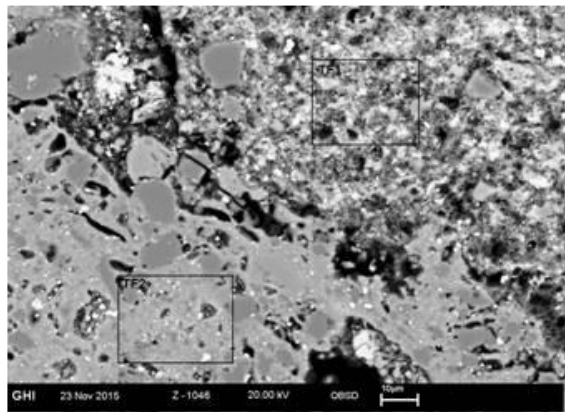
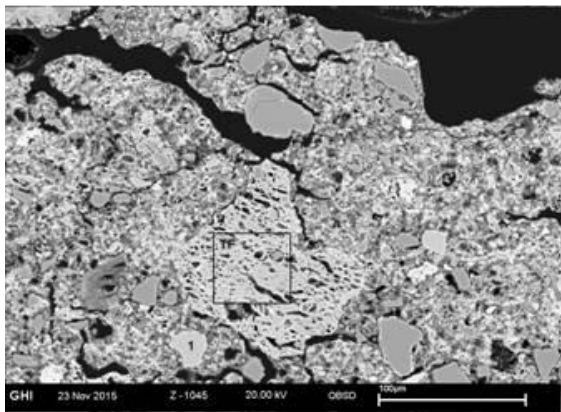
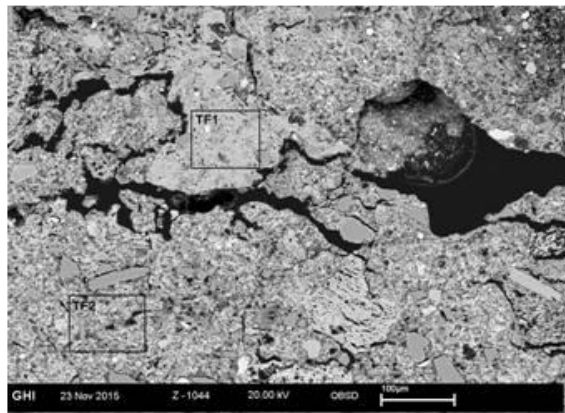
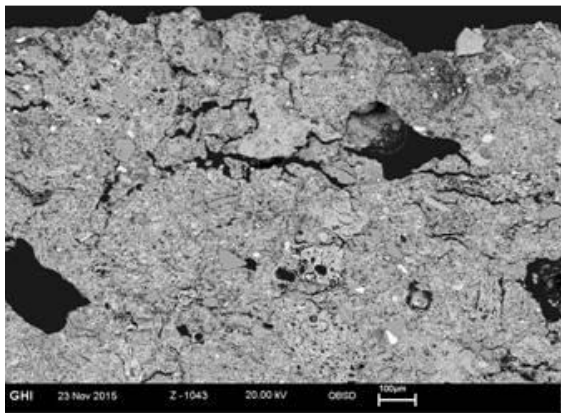
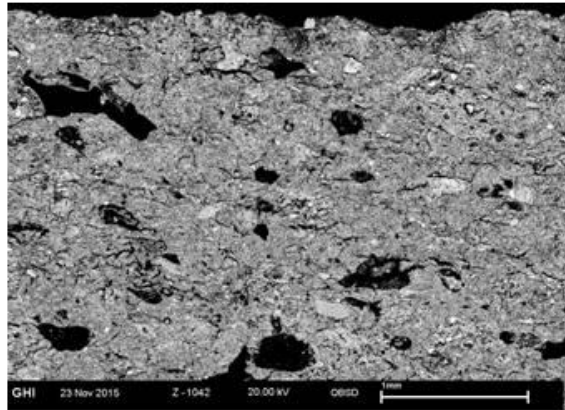
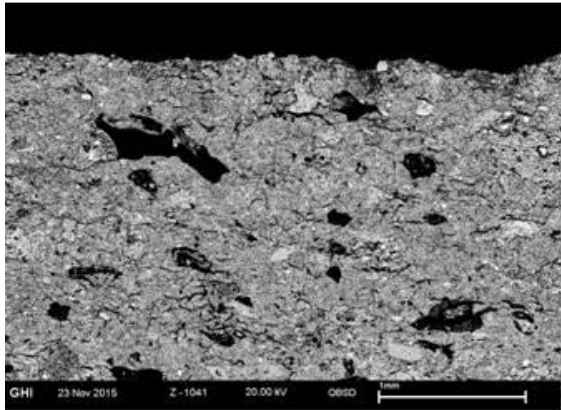




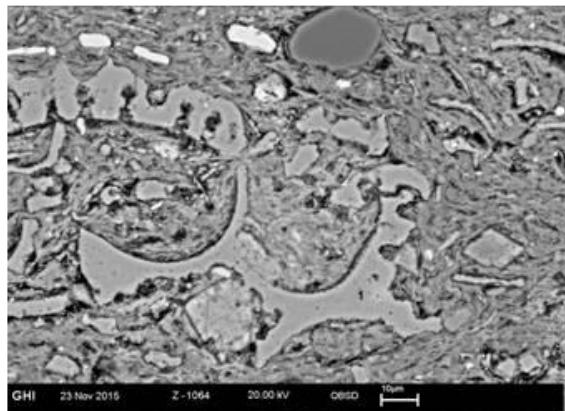
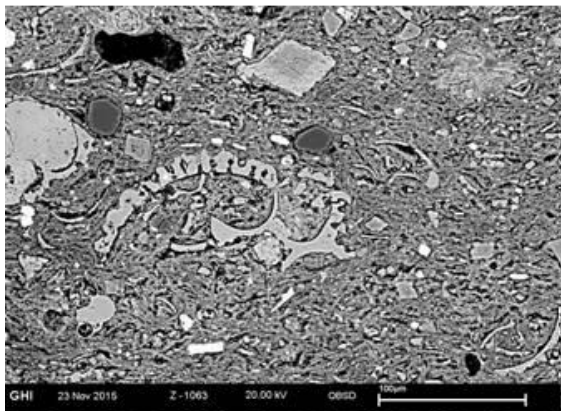
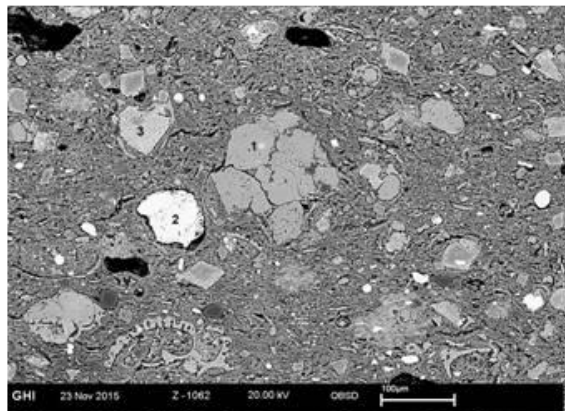
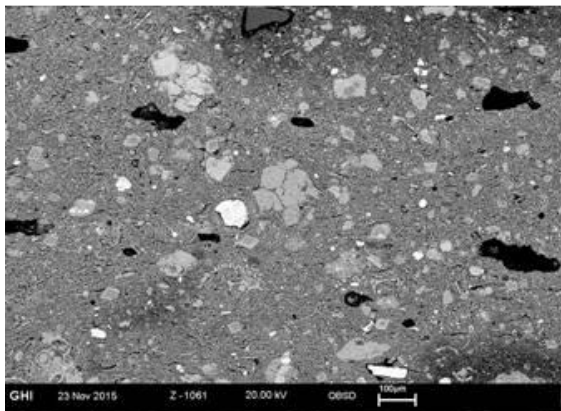
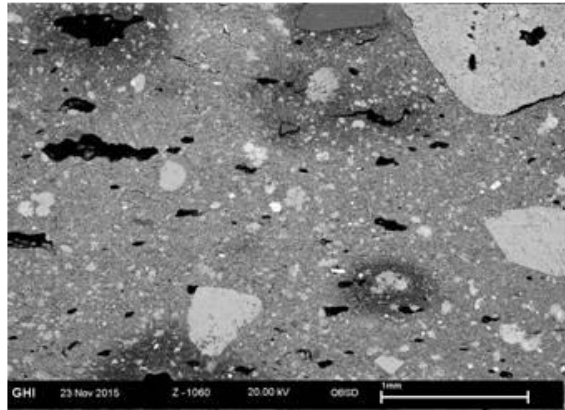
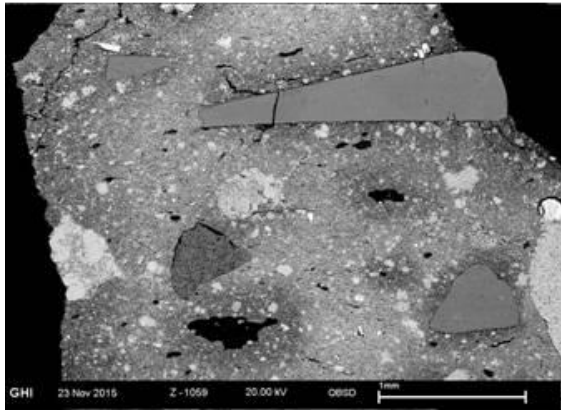
Sample UQ185



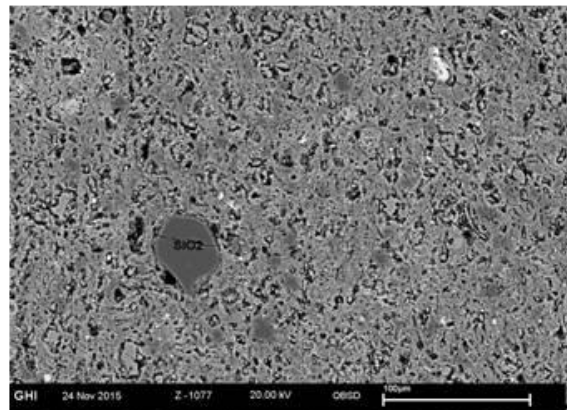
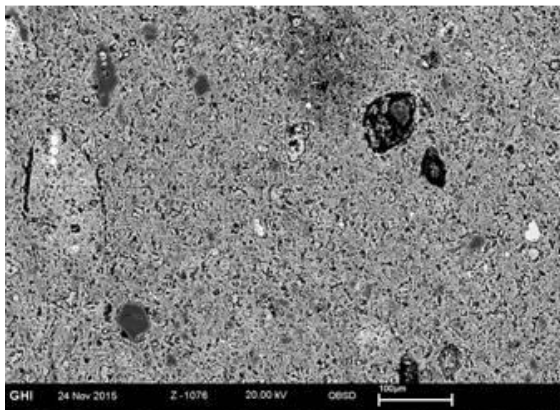
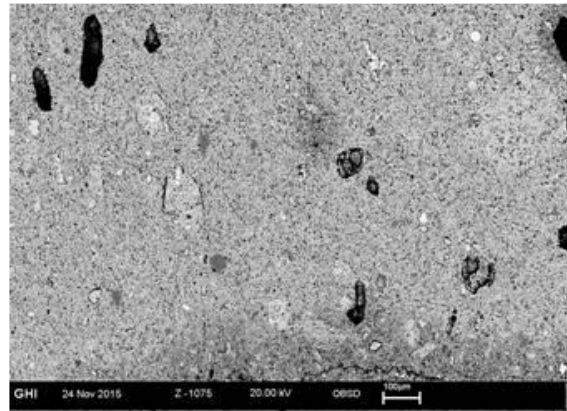
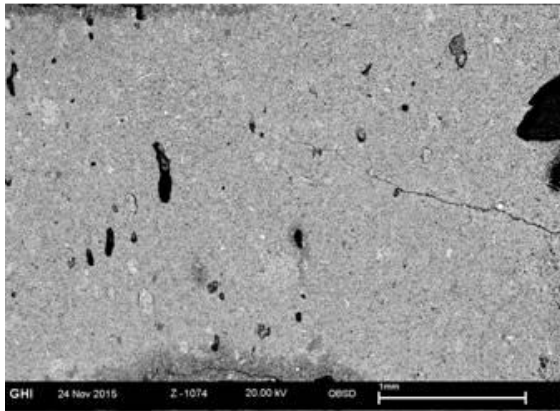
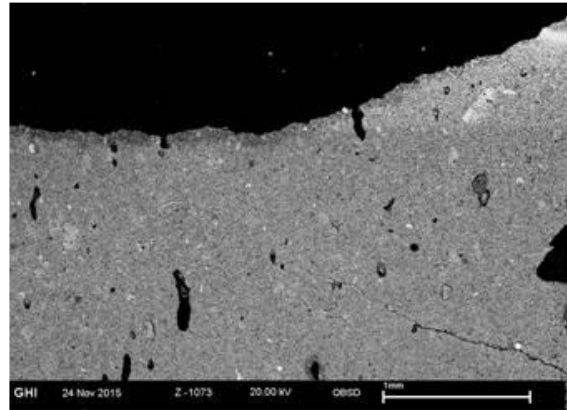
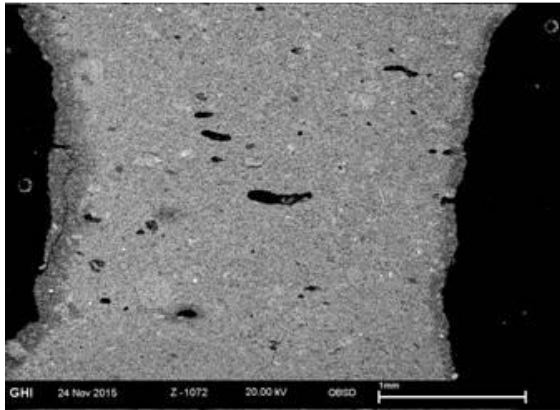
Sample UQ220



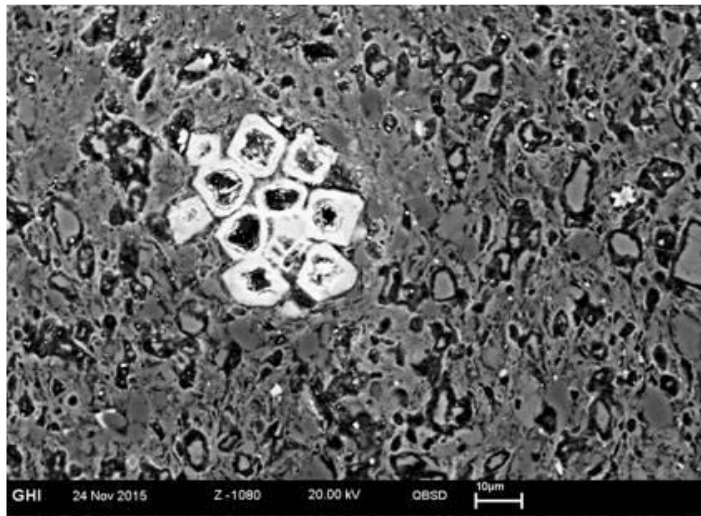
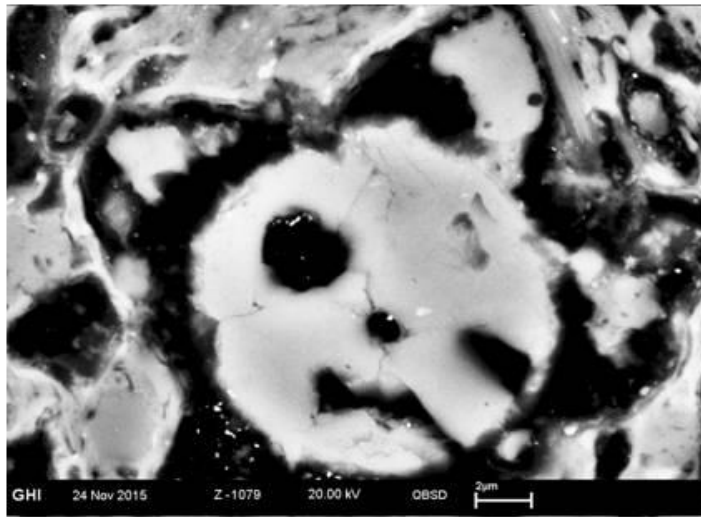
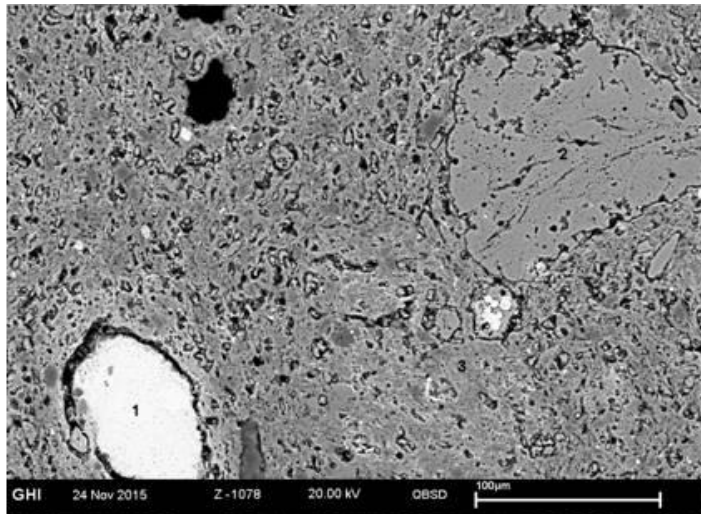
Sample UQ229



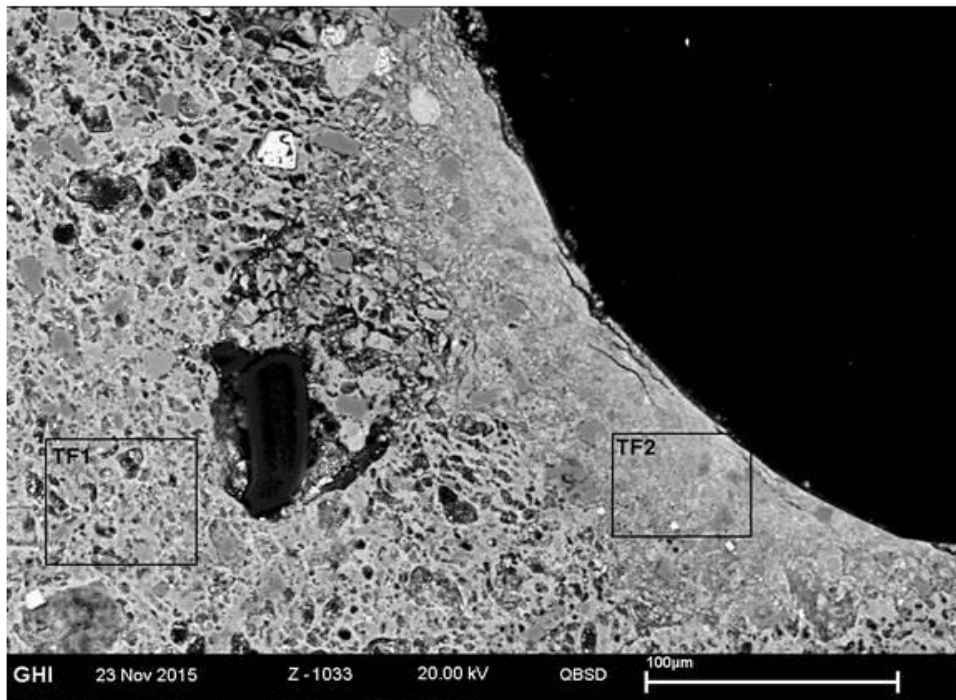
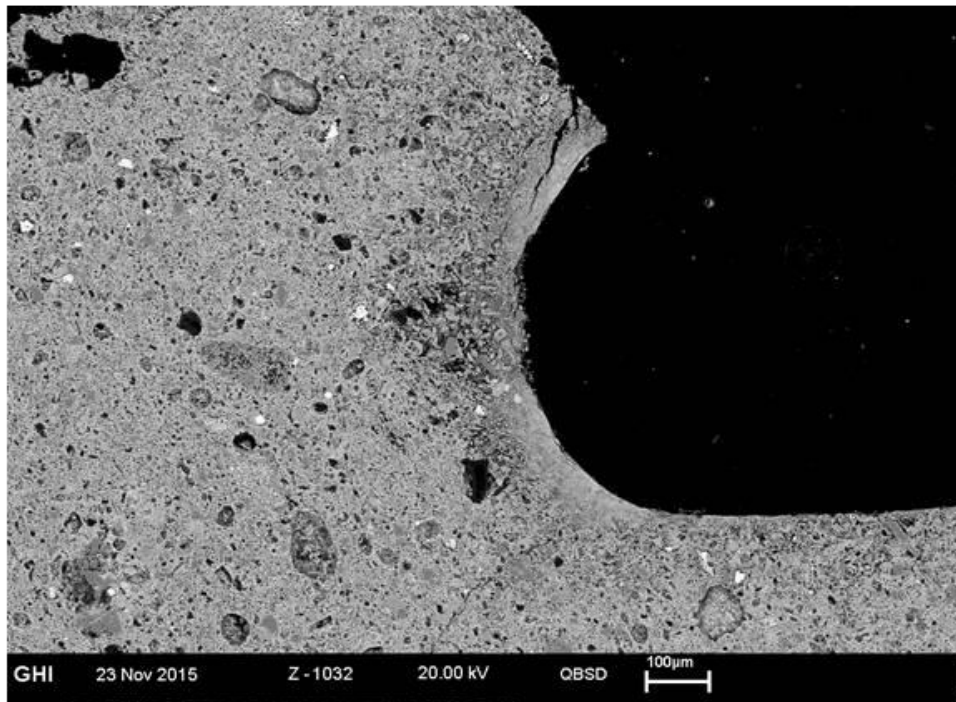
Sample UQ241



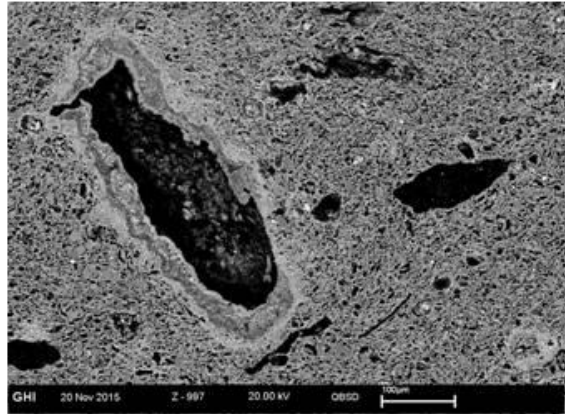
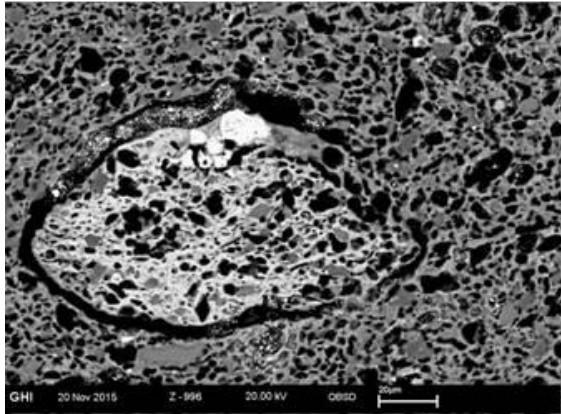
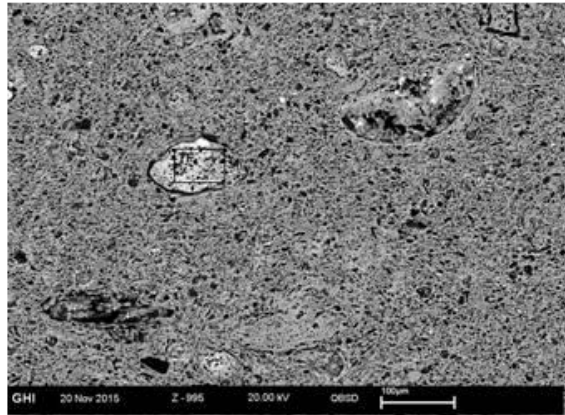
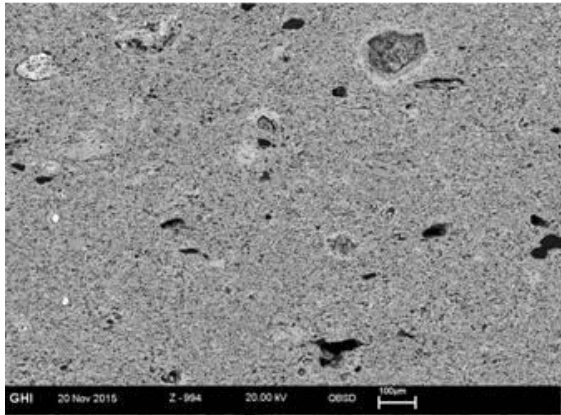
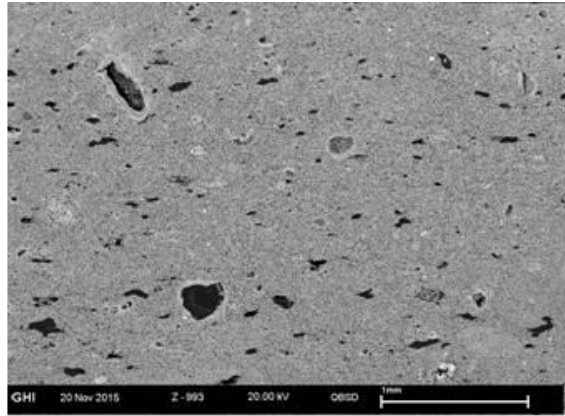
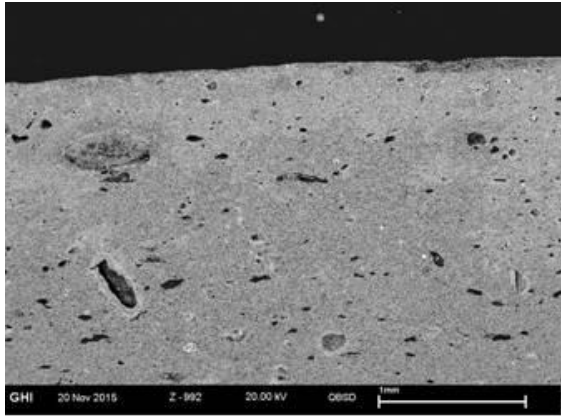
Sample UQ319



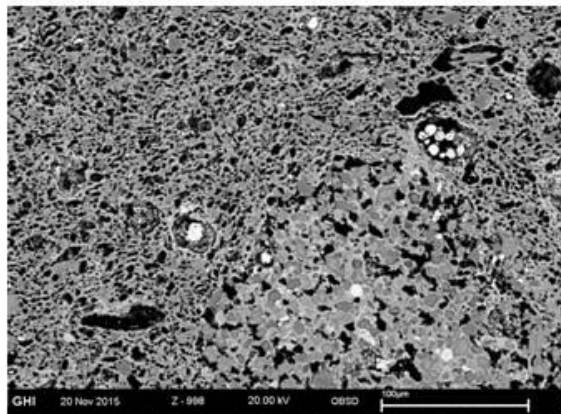
Sample UQ319

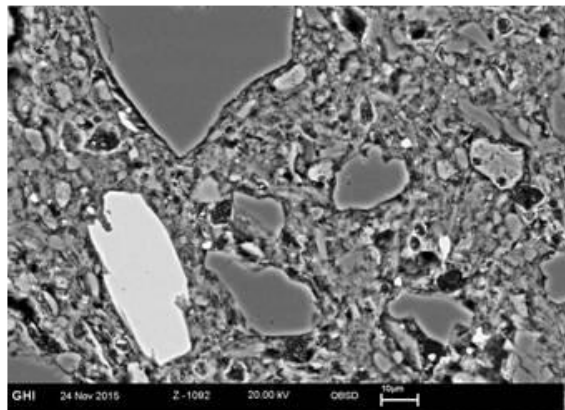
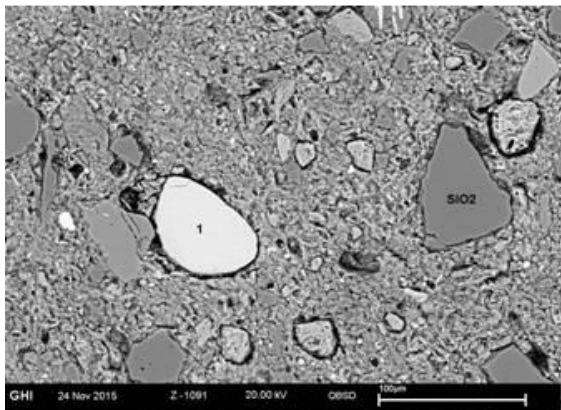
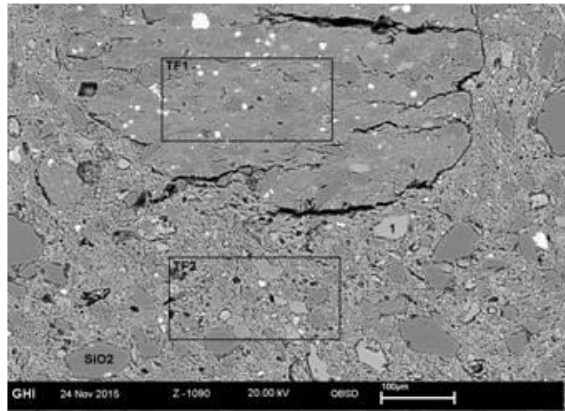
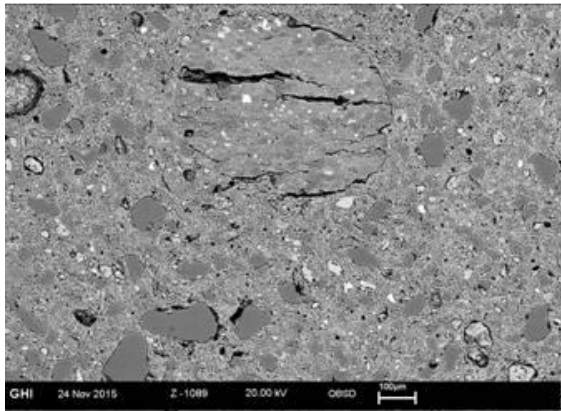
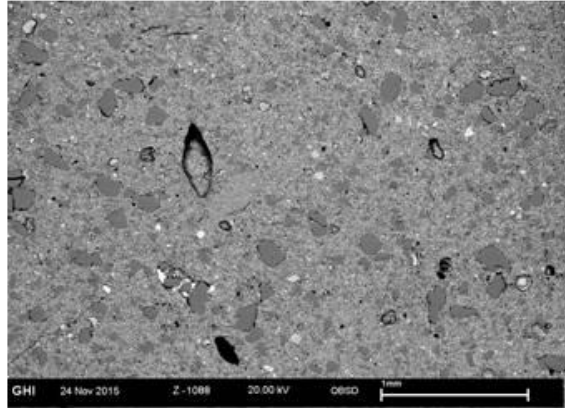
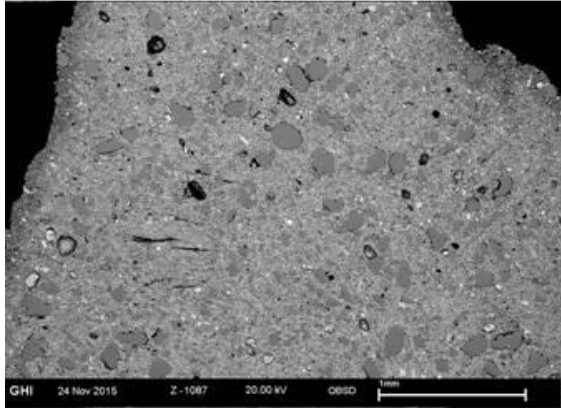


Sample UQ400

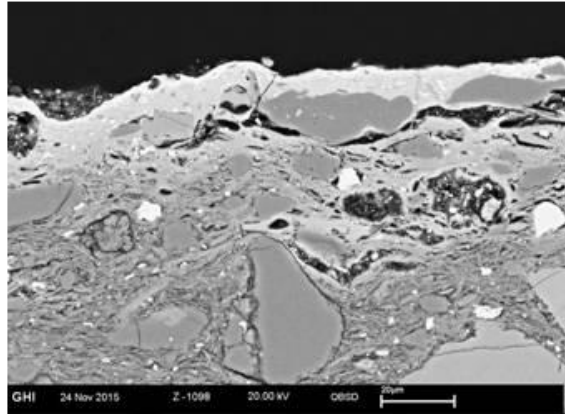
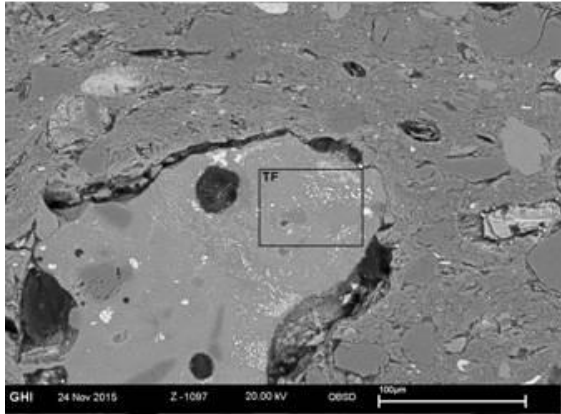
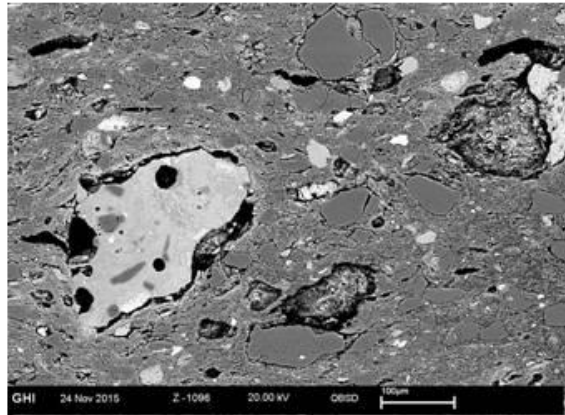
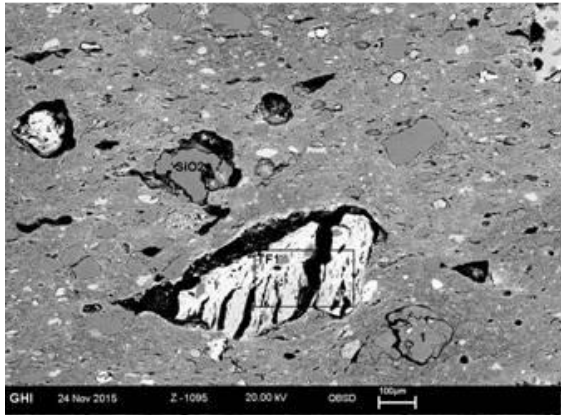
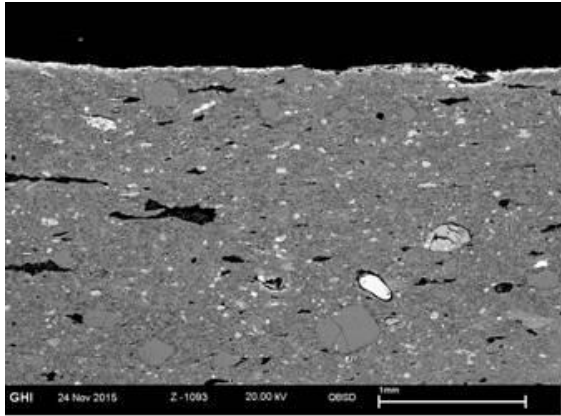


Sample UQ476

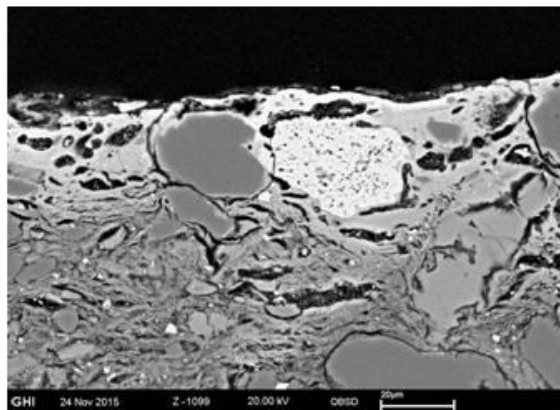


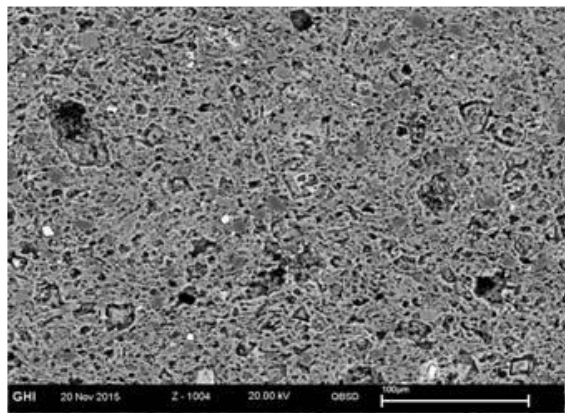
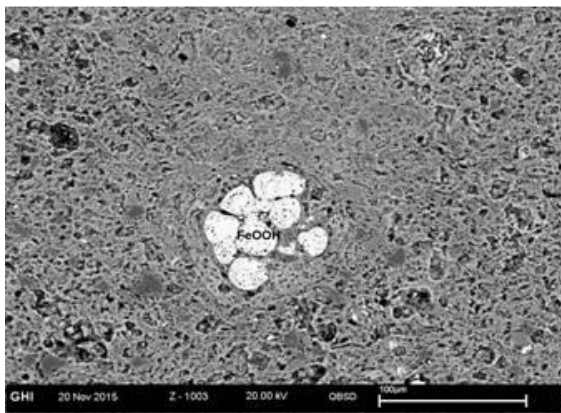
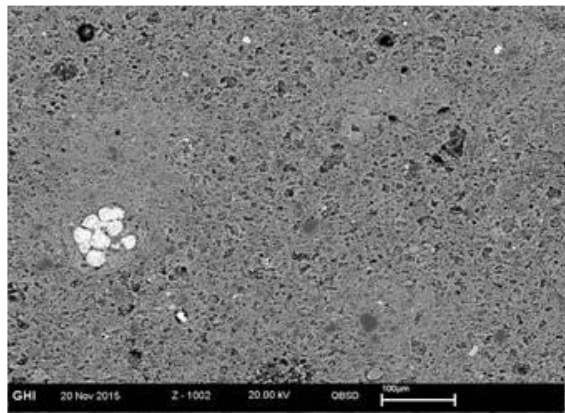
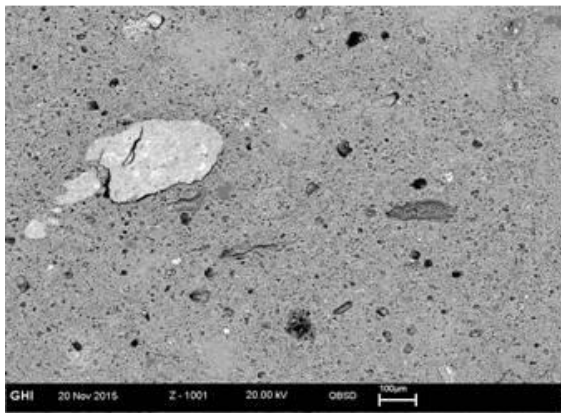
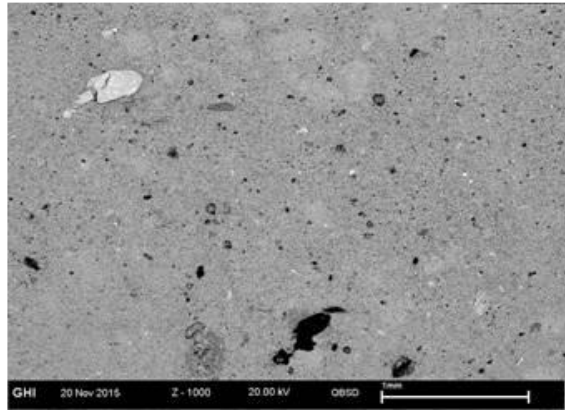
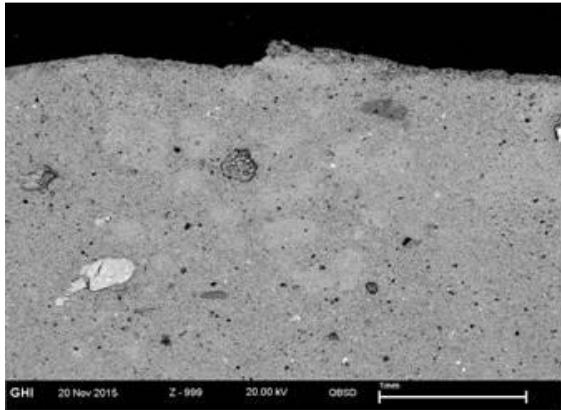


Sample AB285

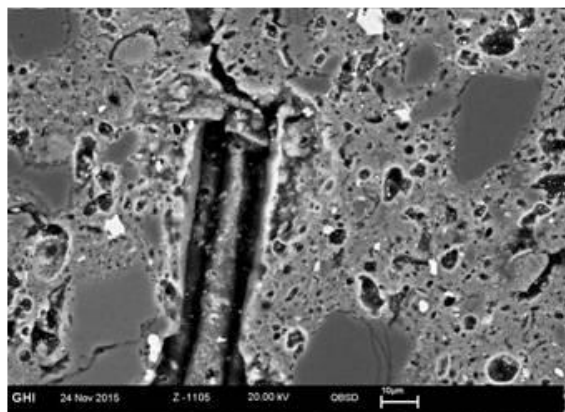
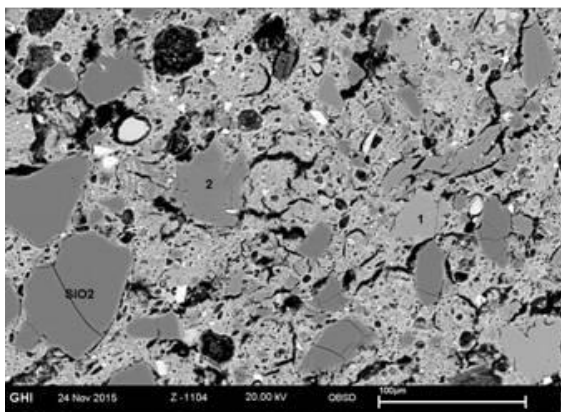
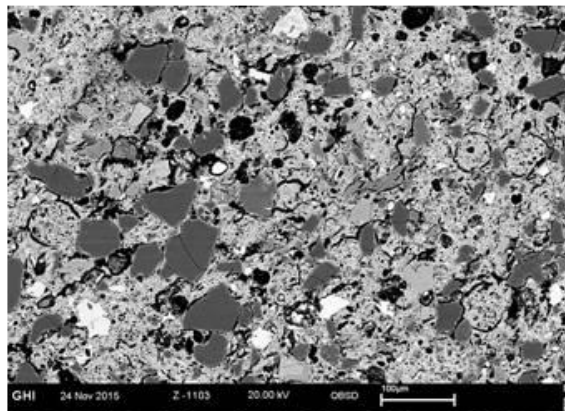
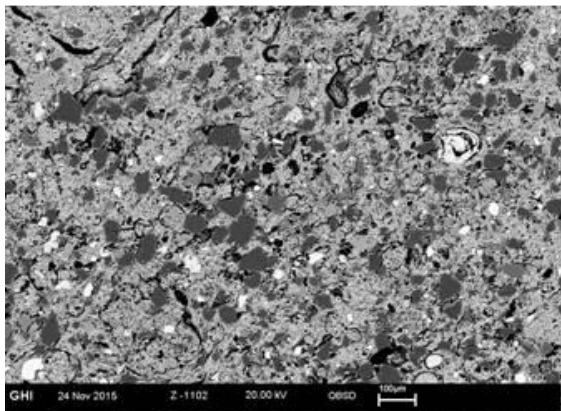
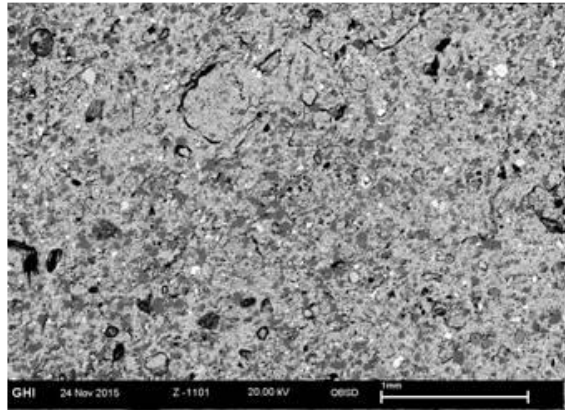
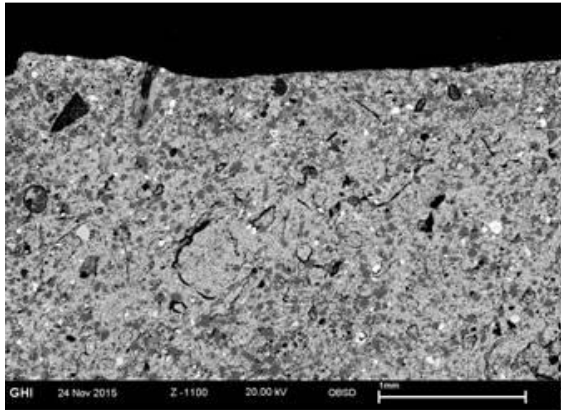


Sample AB291

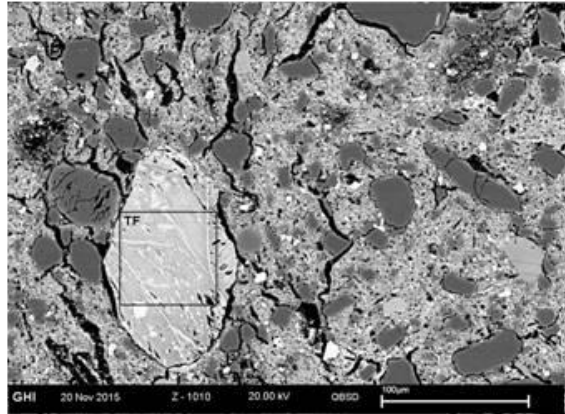
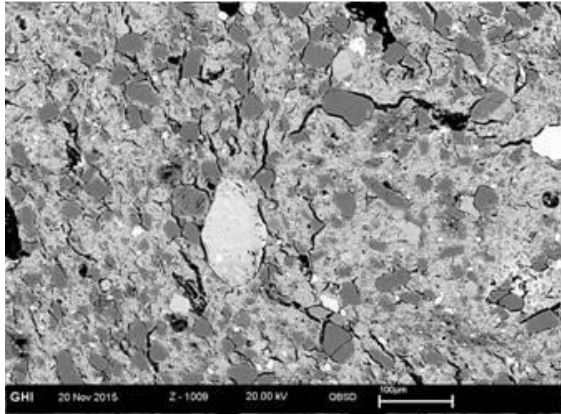
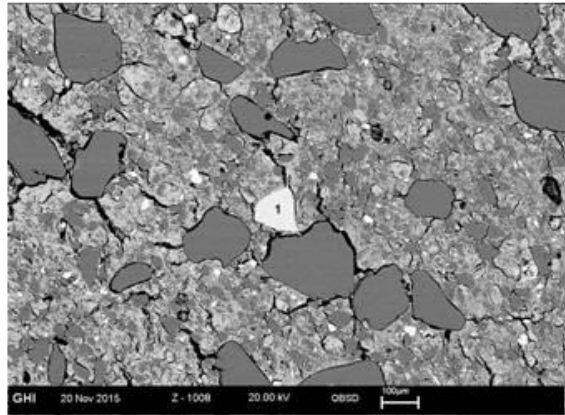
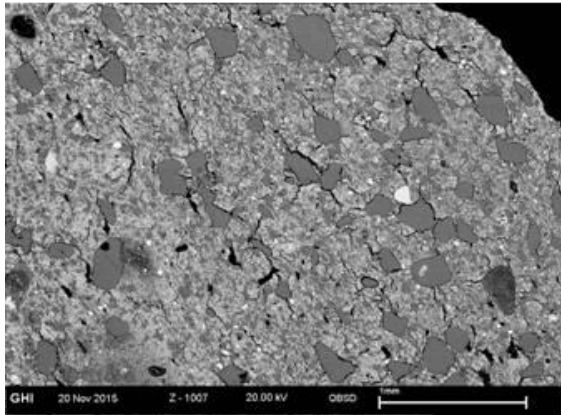
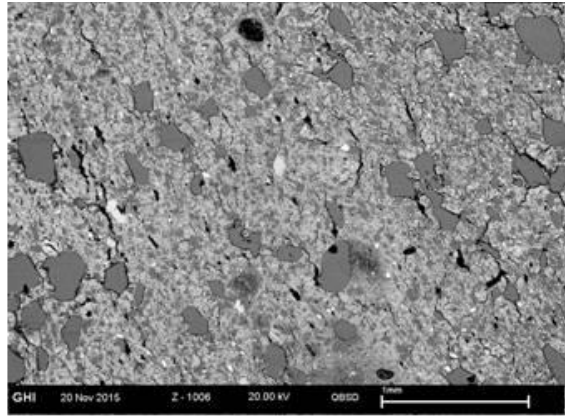
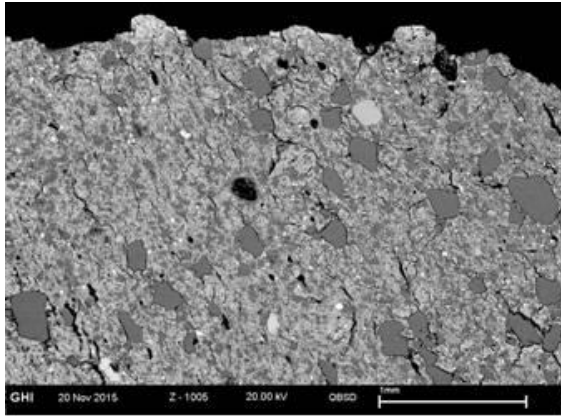




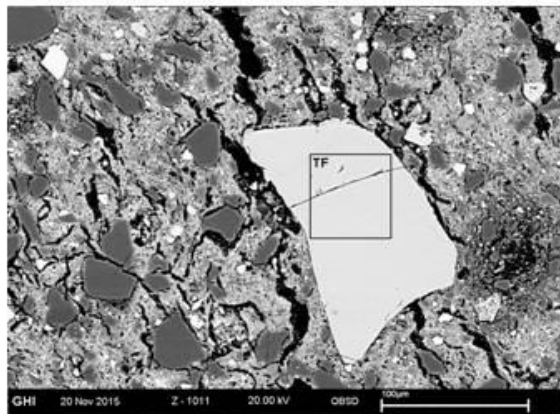
Sample AB350

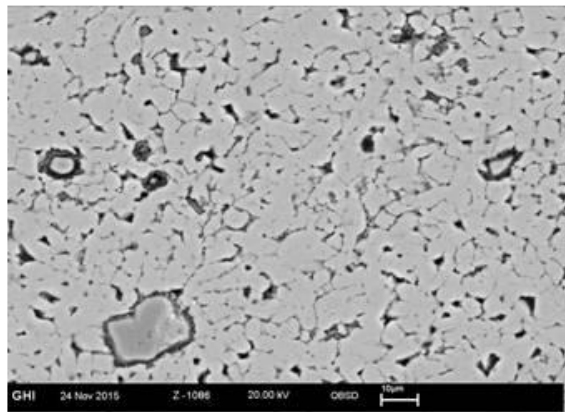
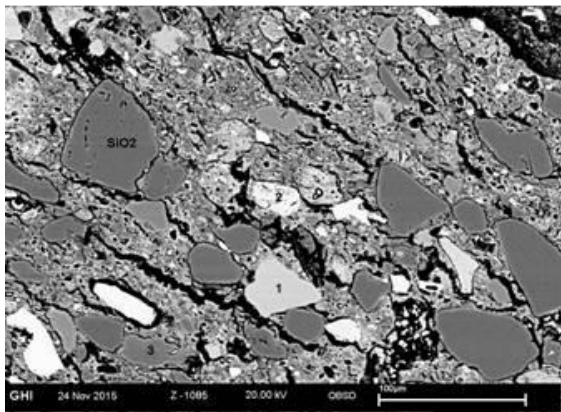
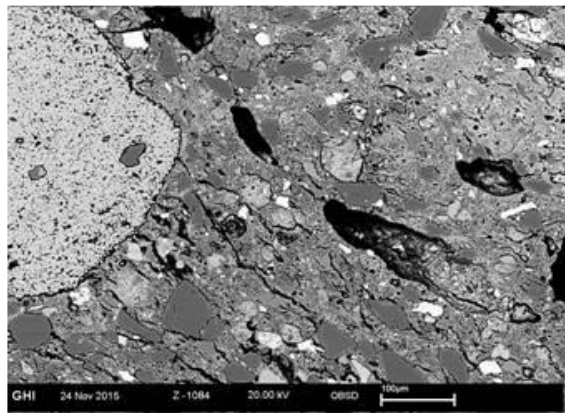
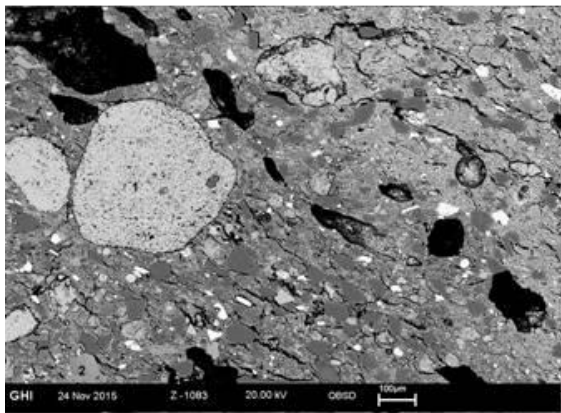
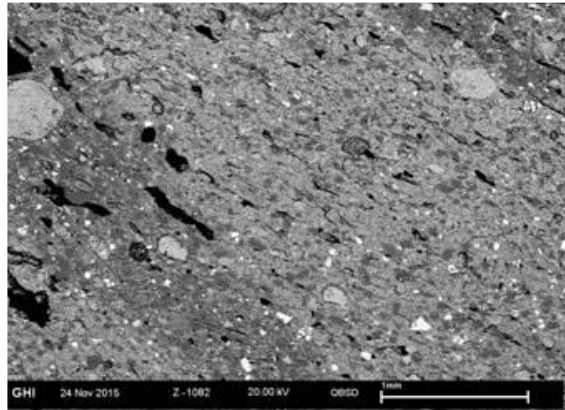
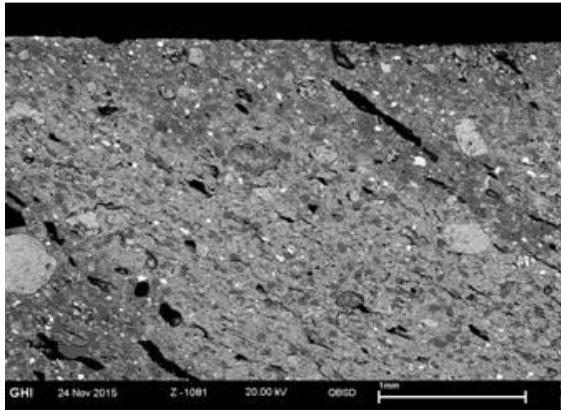


Sample AB362

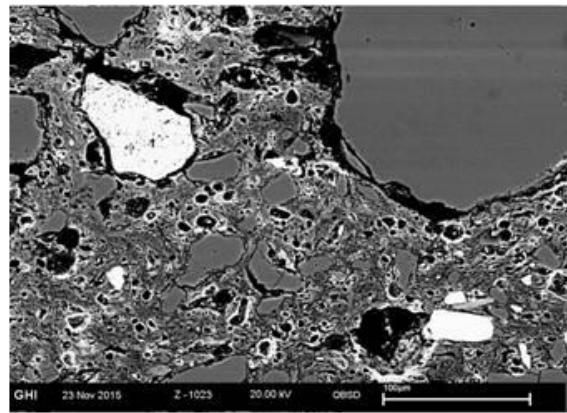
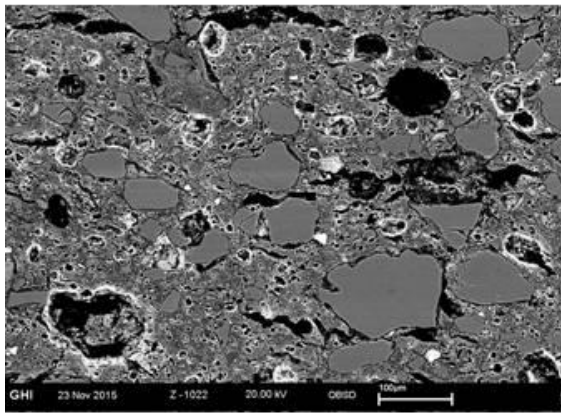
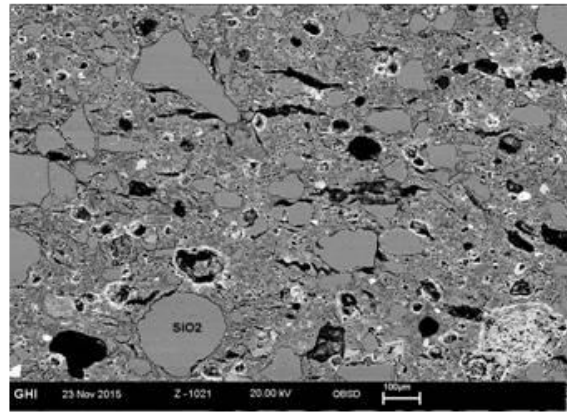
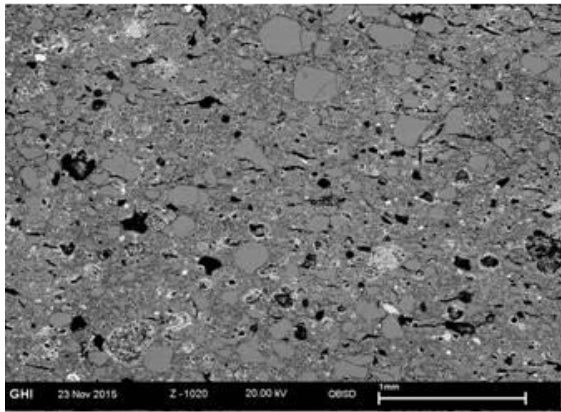
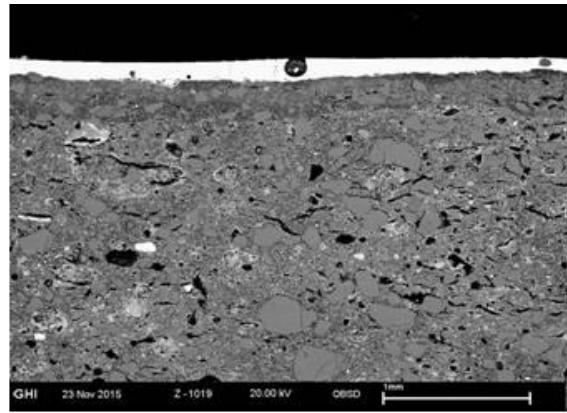
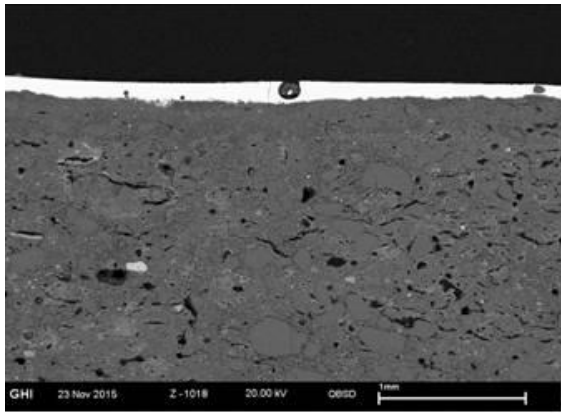


Sample AB392

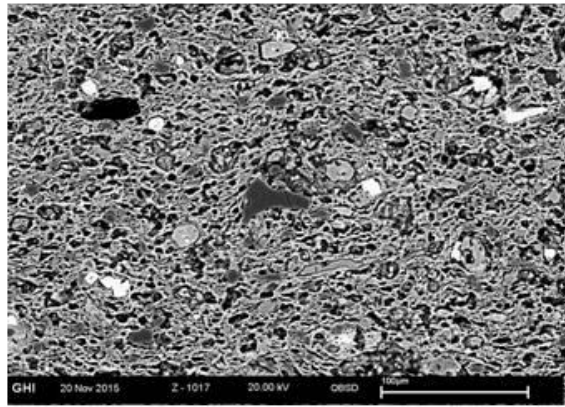
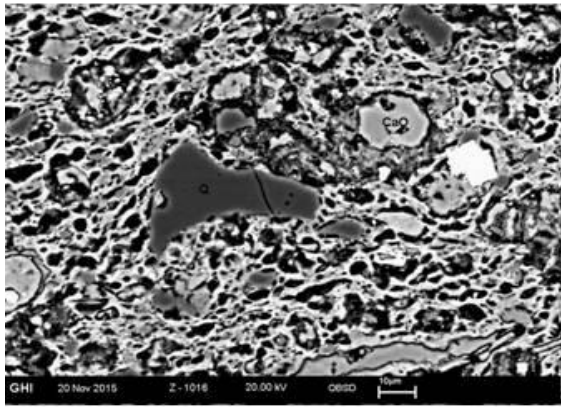
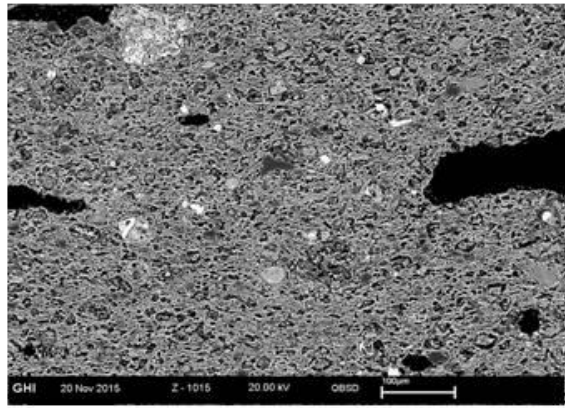
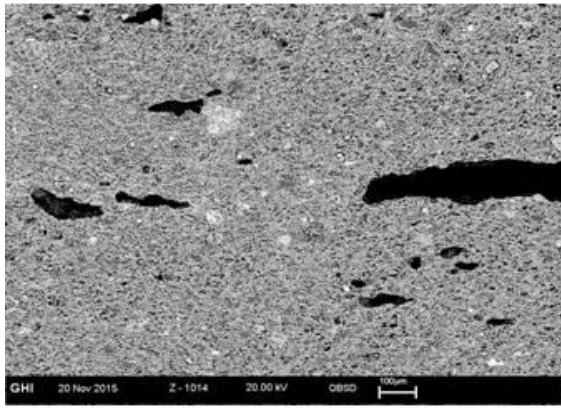
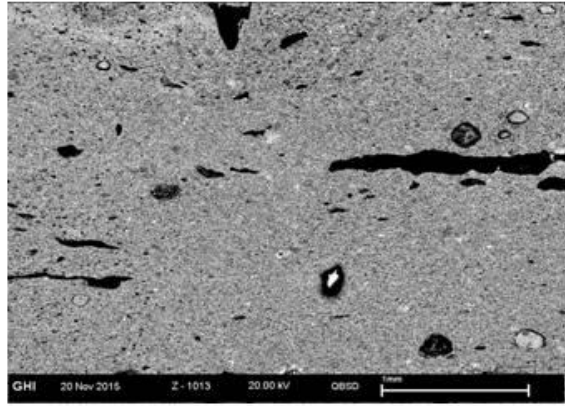
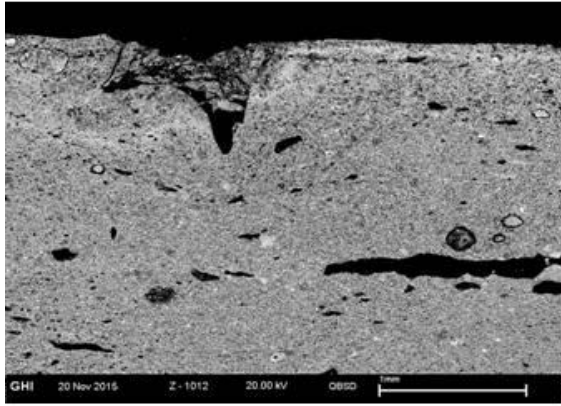




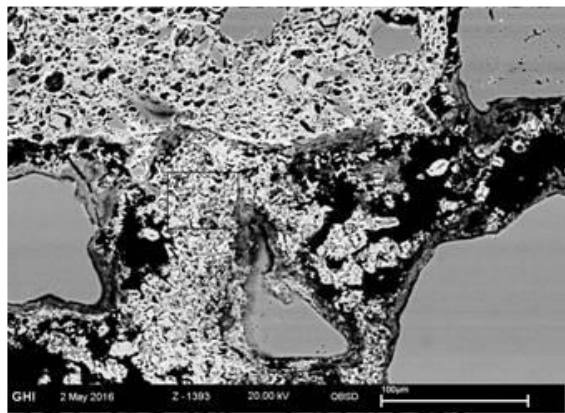
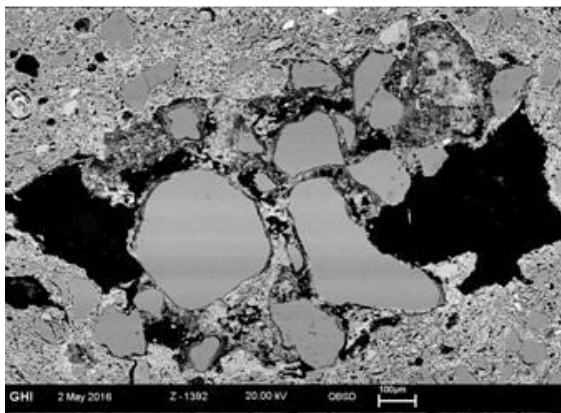
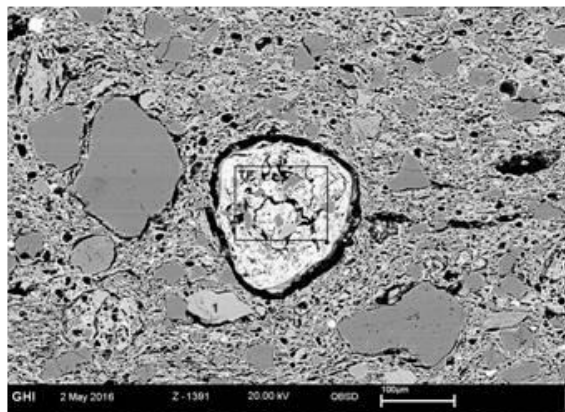
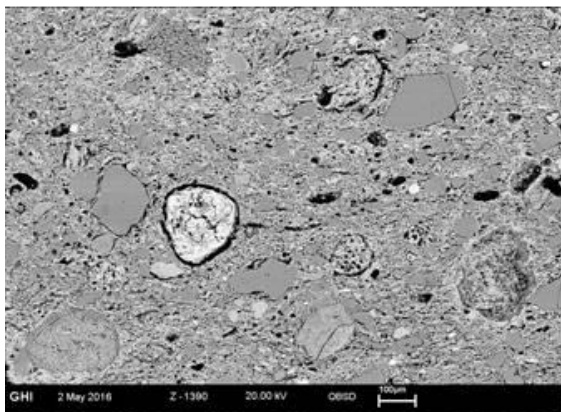
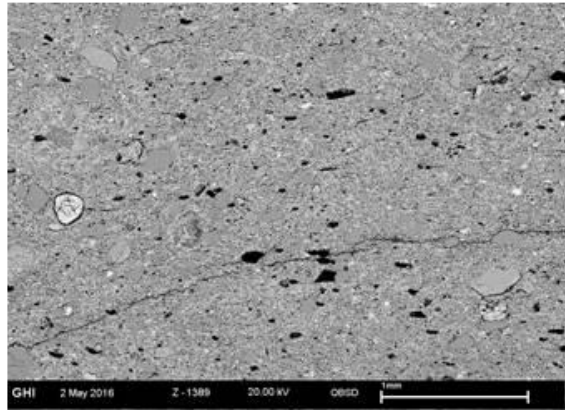
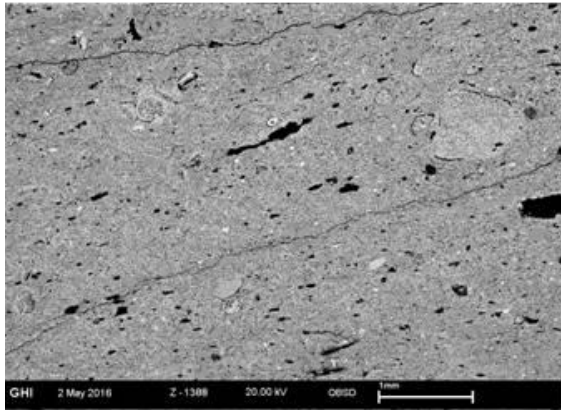
Sample AB451



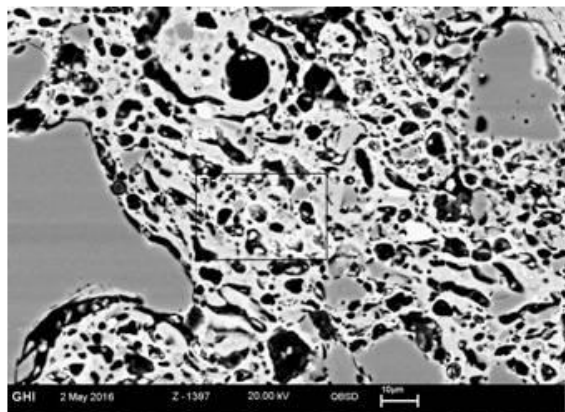
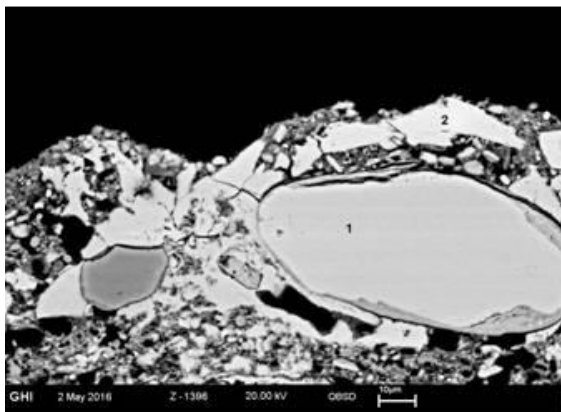
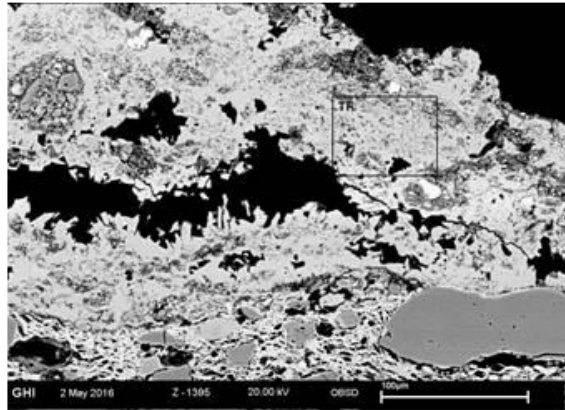
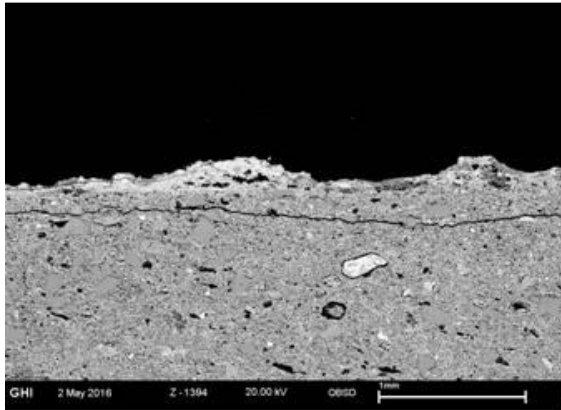
Sample AB509



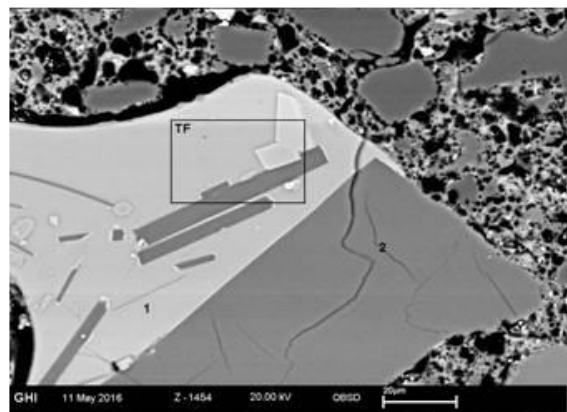
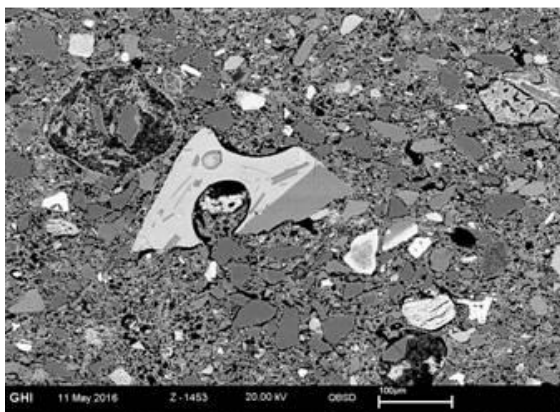
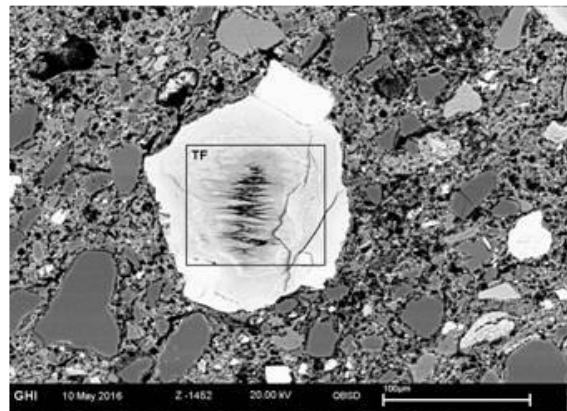
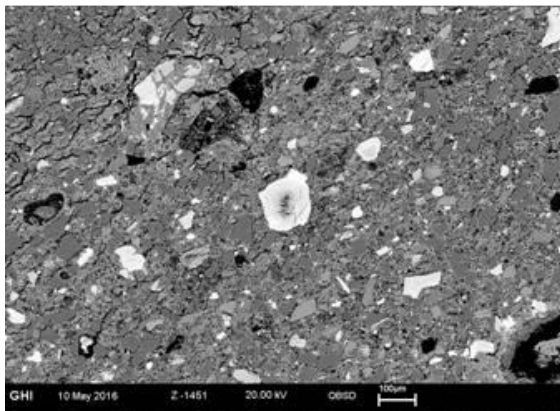
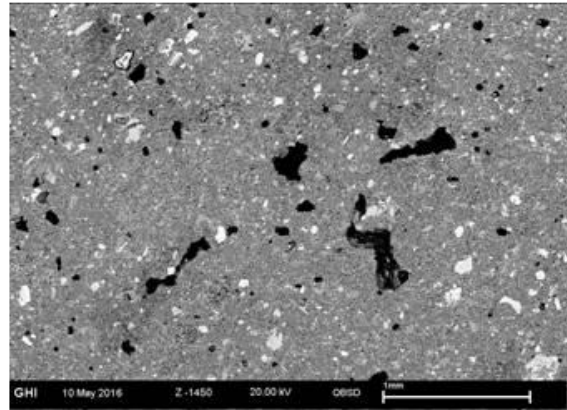
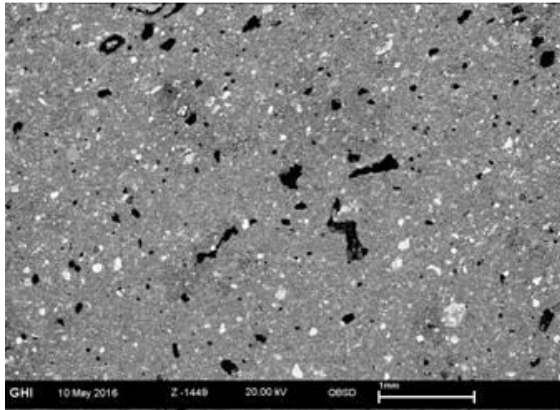
Sample AB522



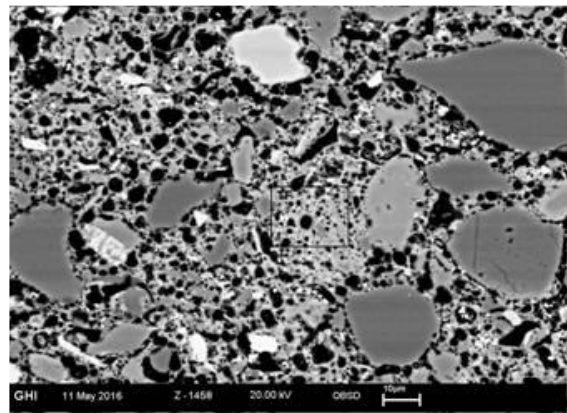
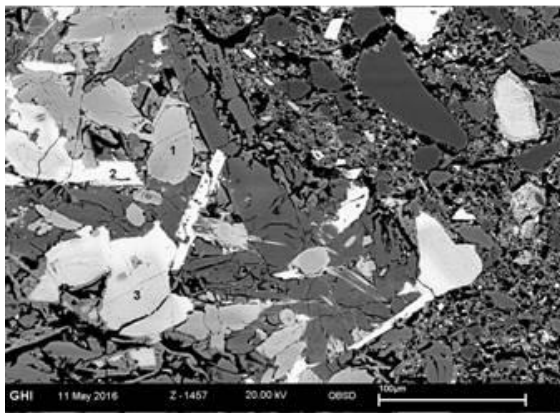
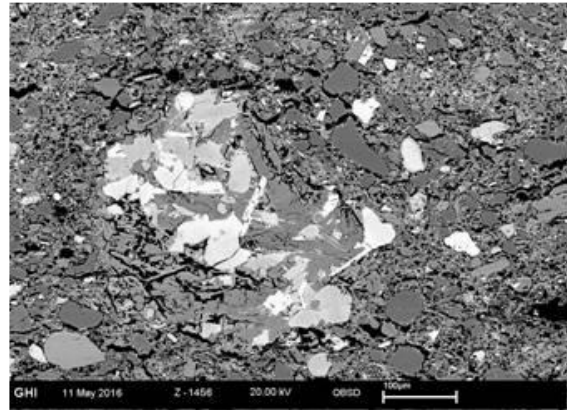
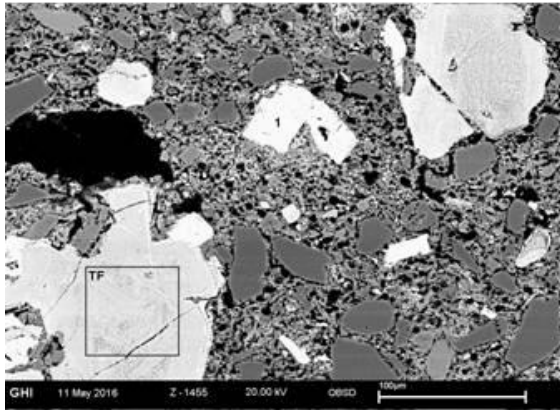
Sample UJ98



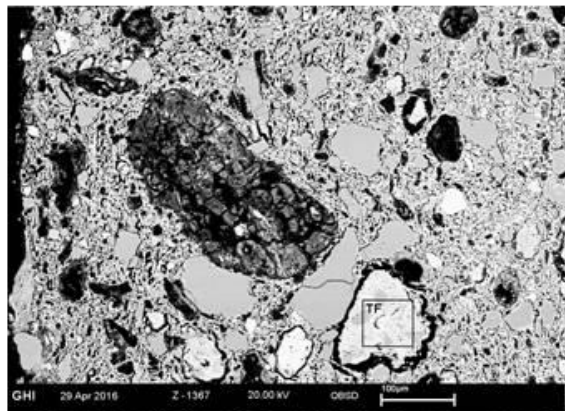
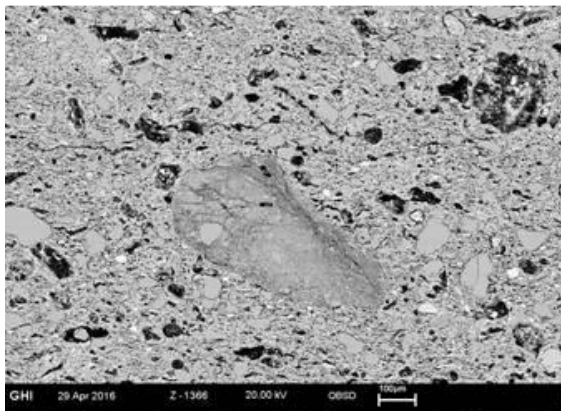
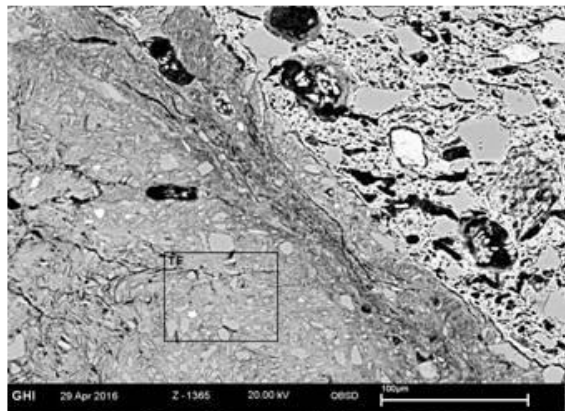
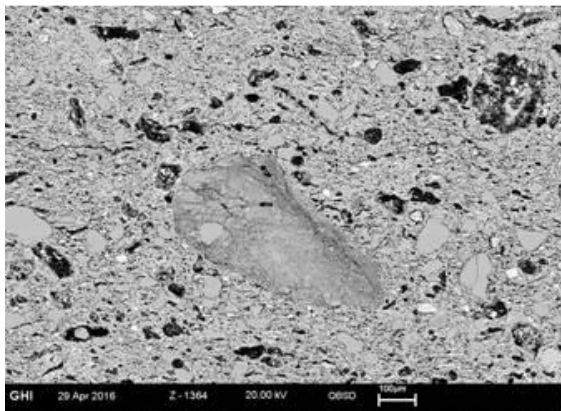
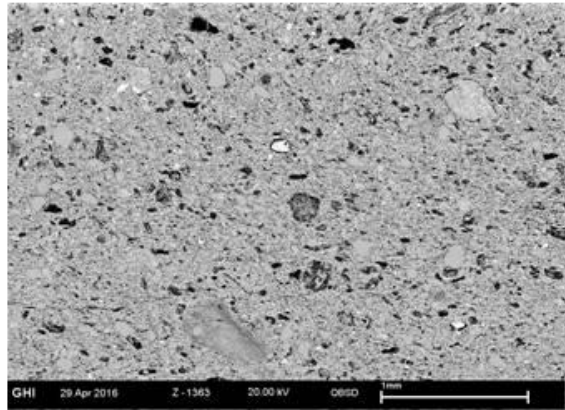
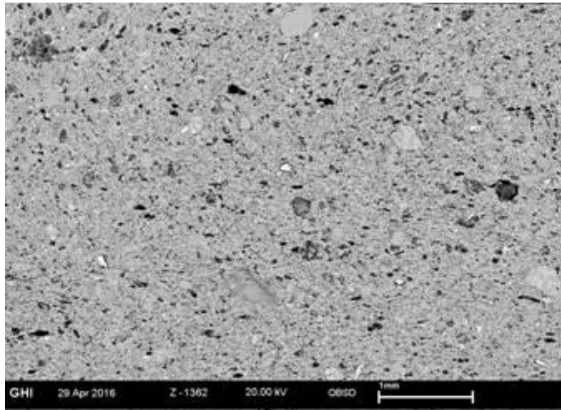
Sample UJ98



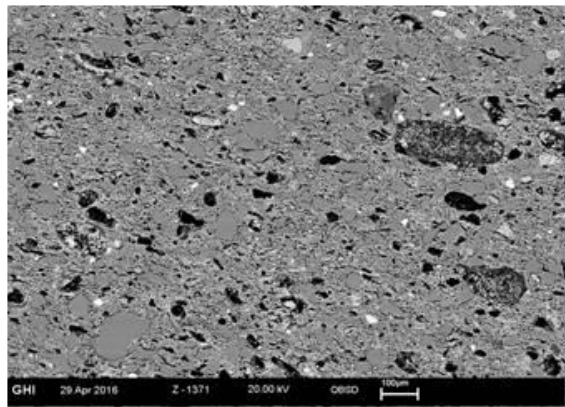
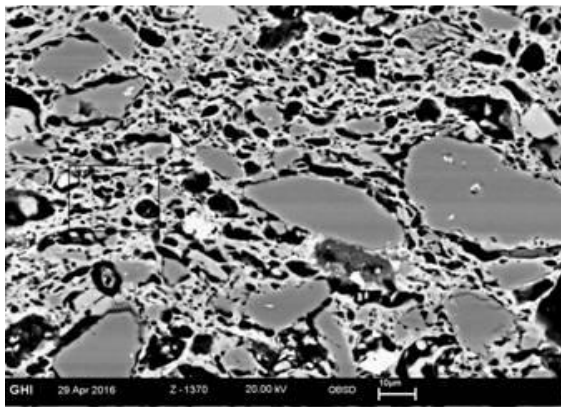
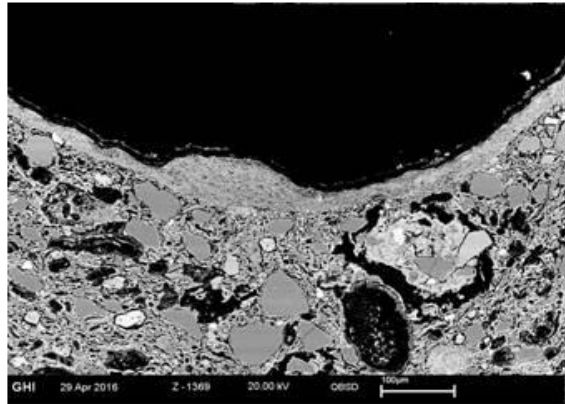
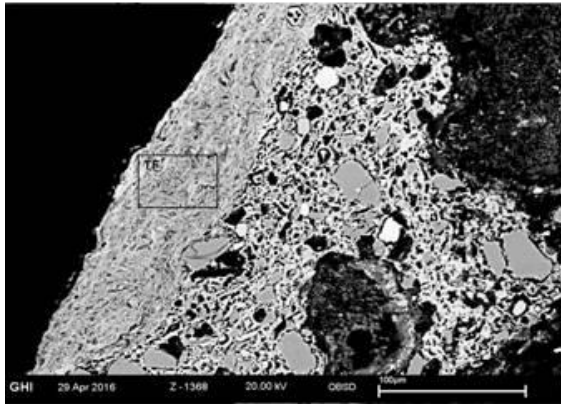
Sample UJ144



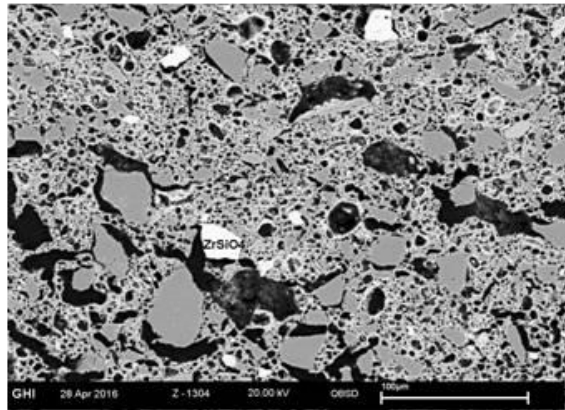
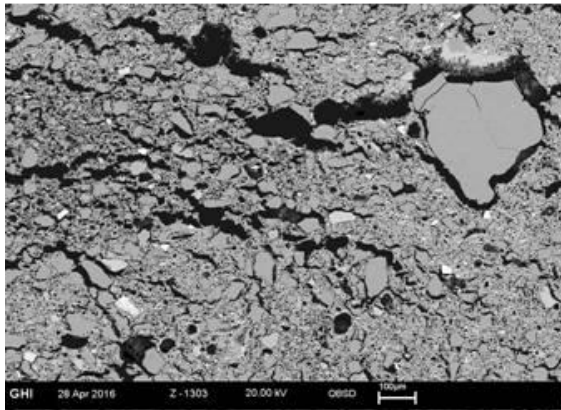
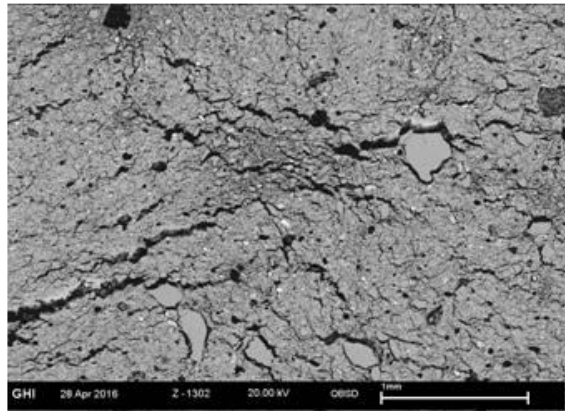
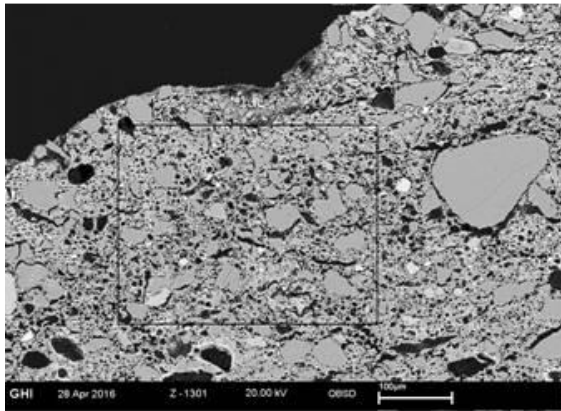
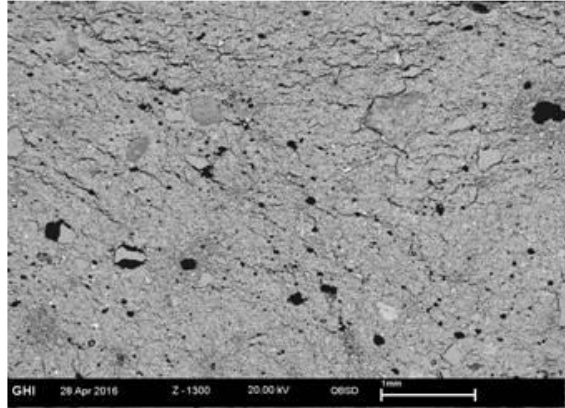
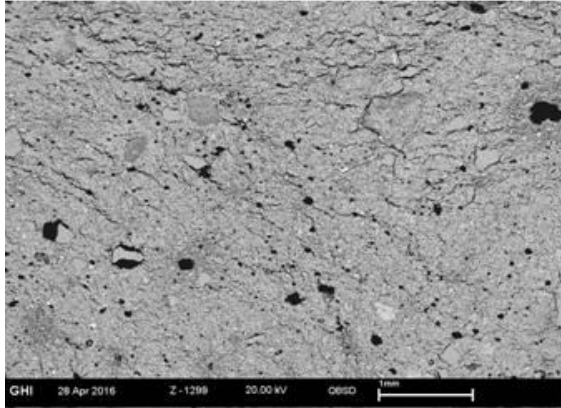
Sample UJ144



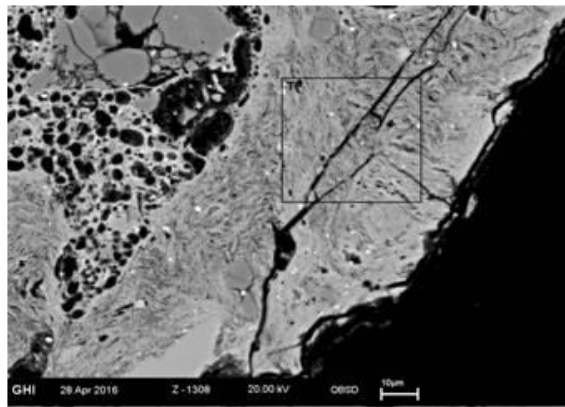
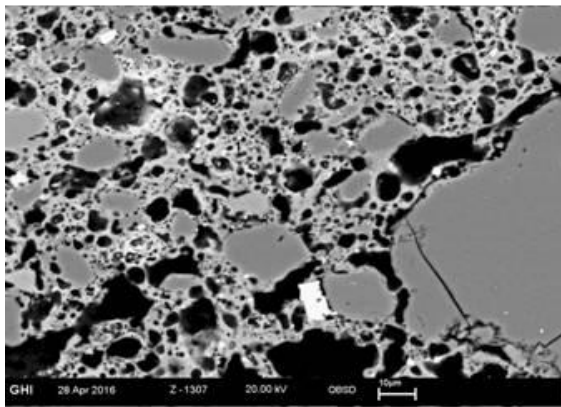
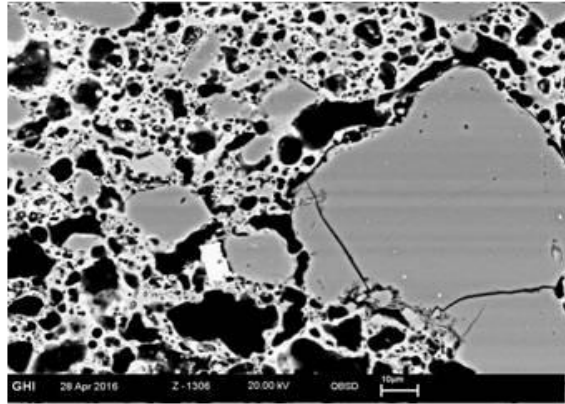
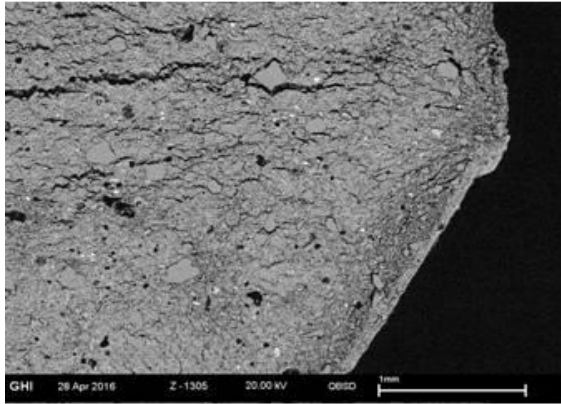
Sample UJ148



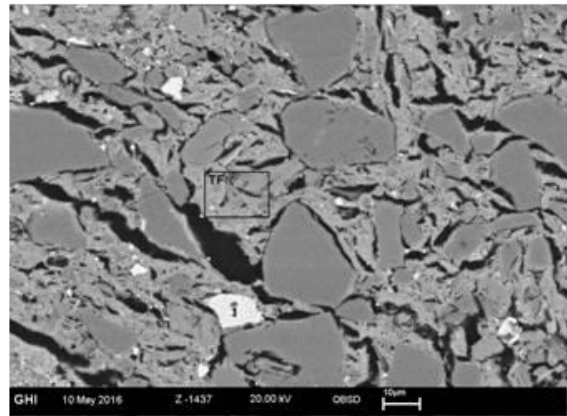
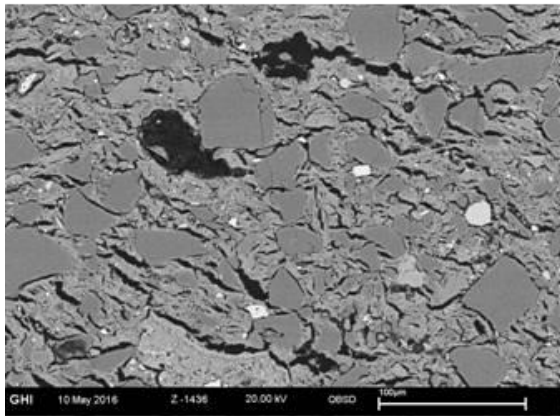
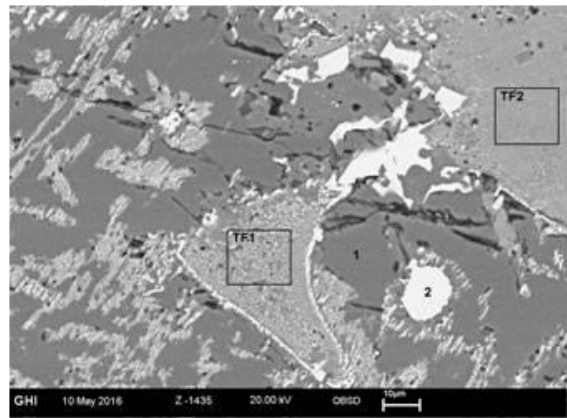
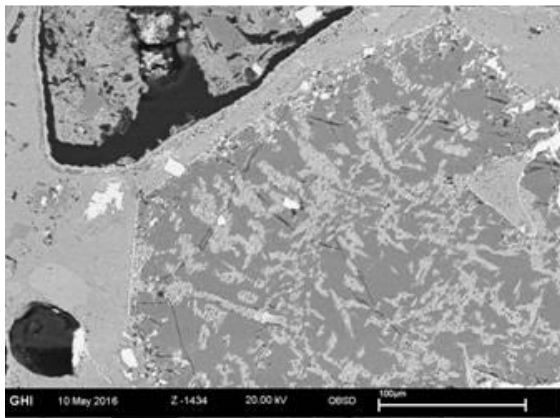
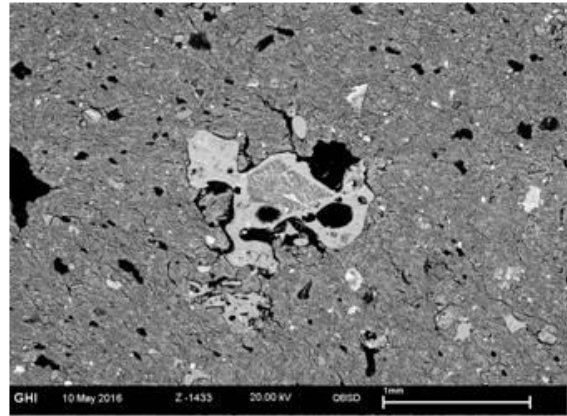
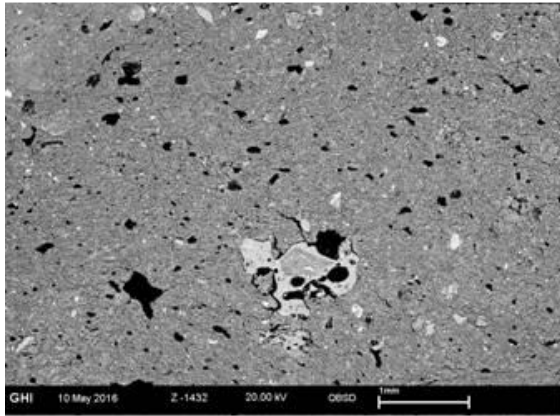
Sample UJ148



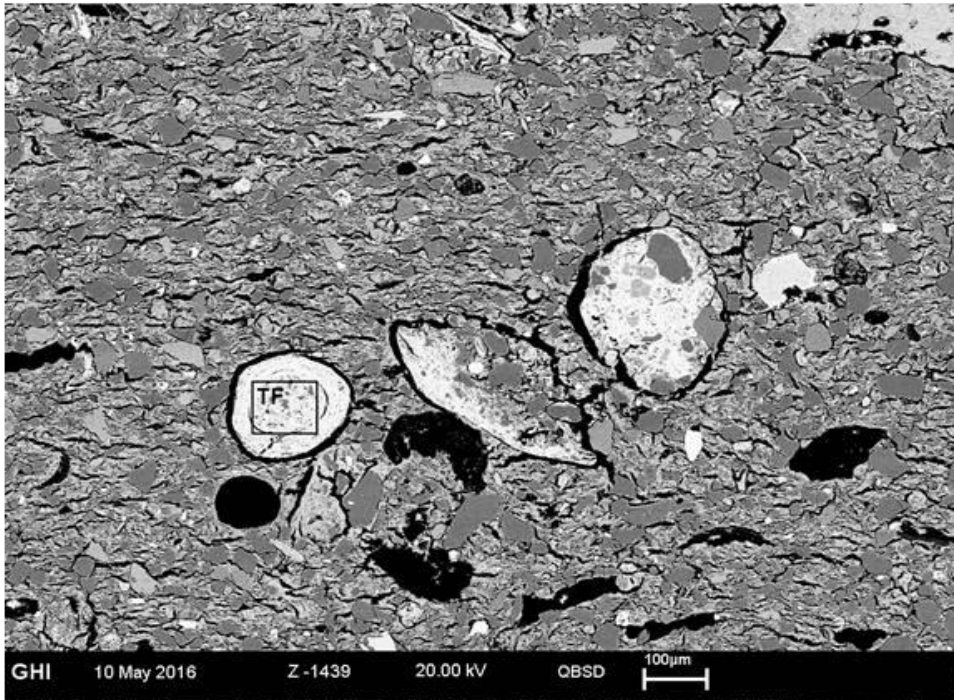
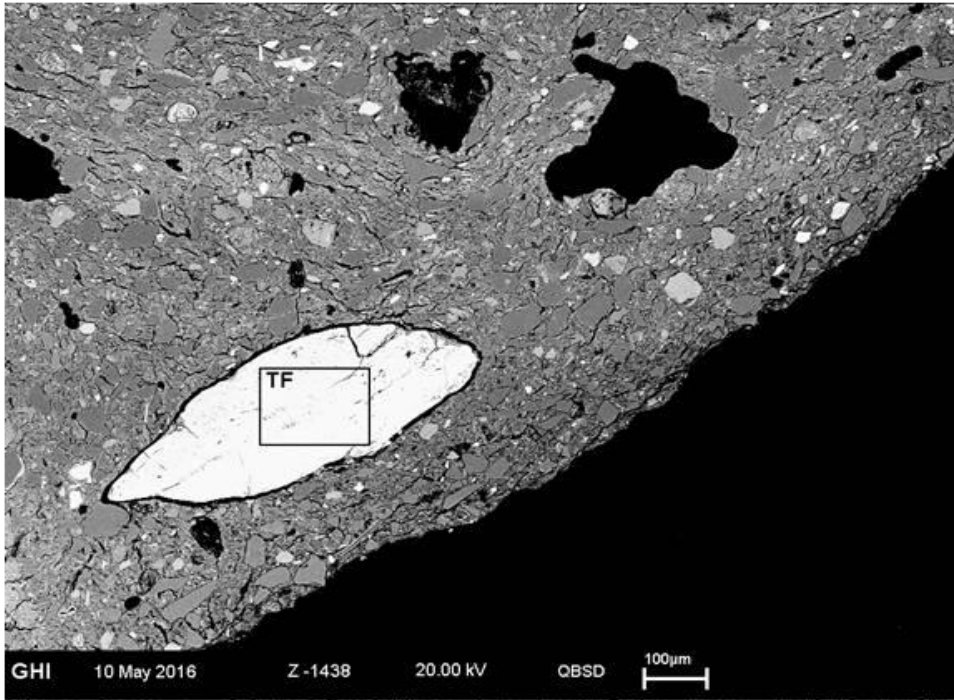
Sample UJ150



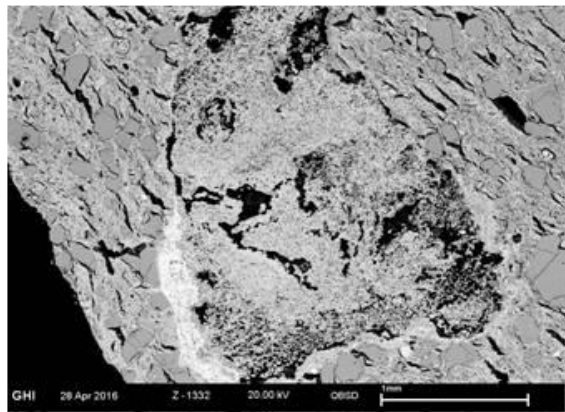
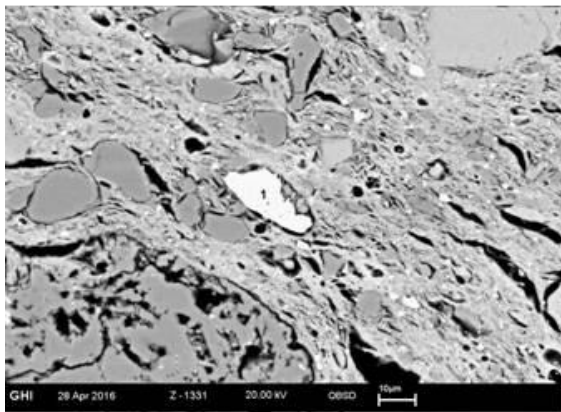
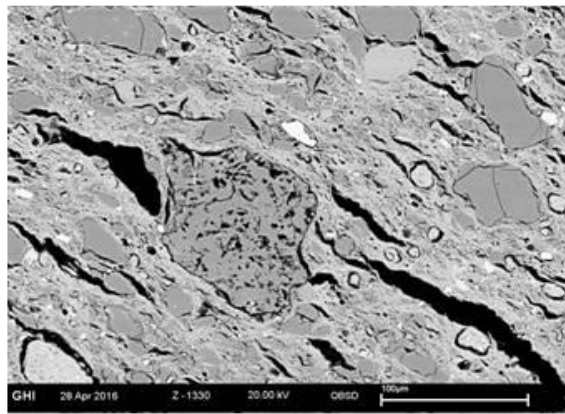
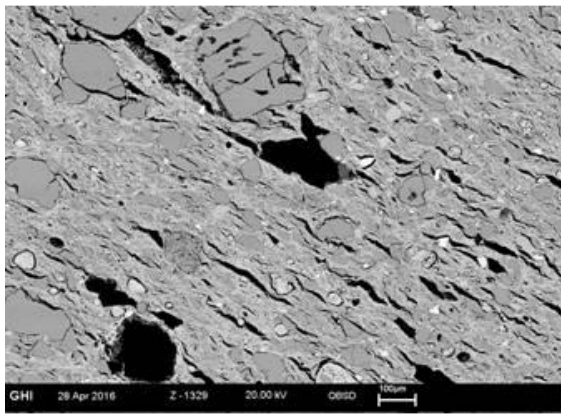
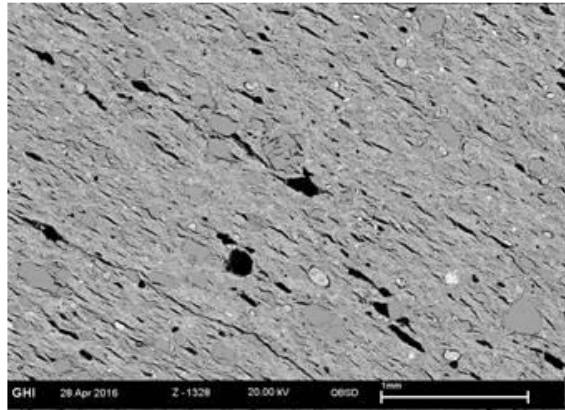
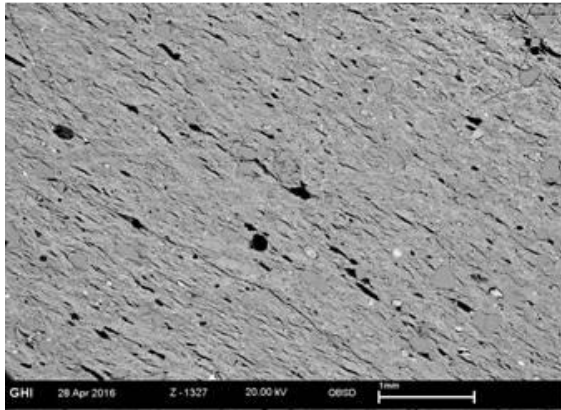
Sample UJ150



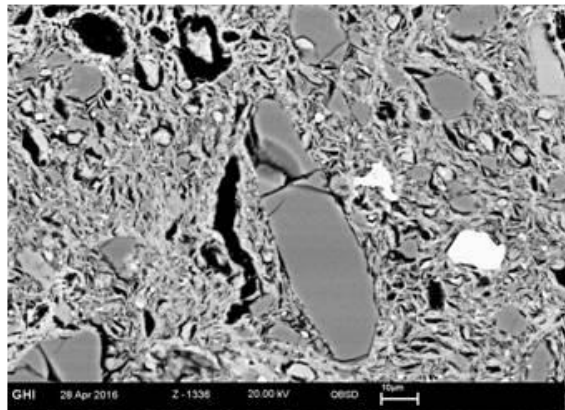
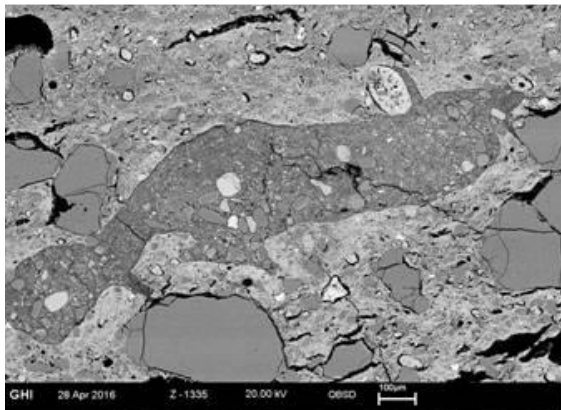
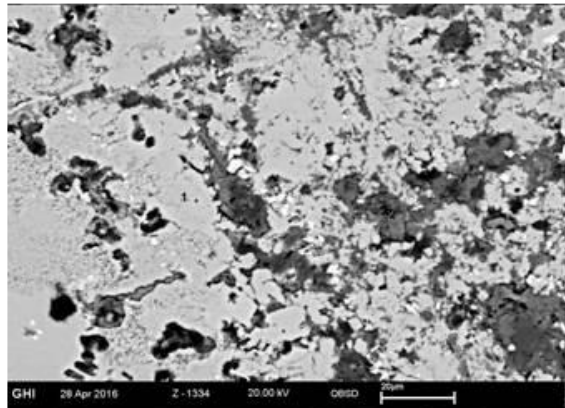
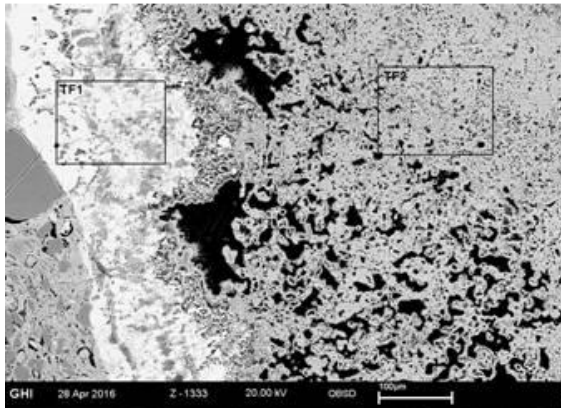
Sample UJ173



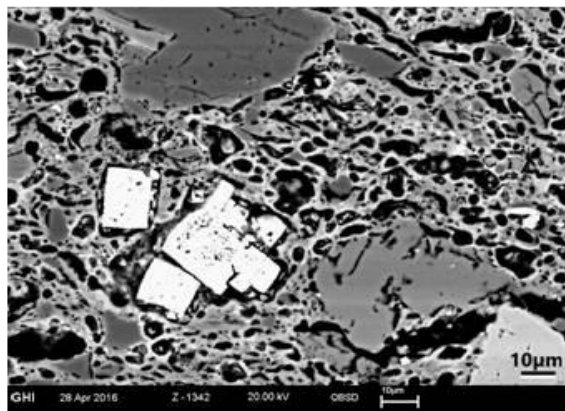
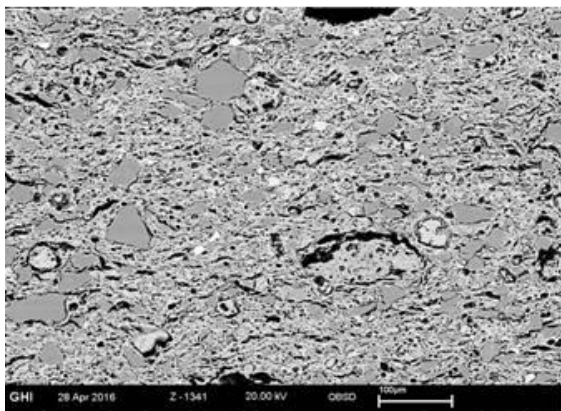
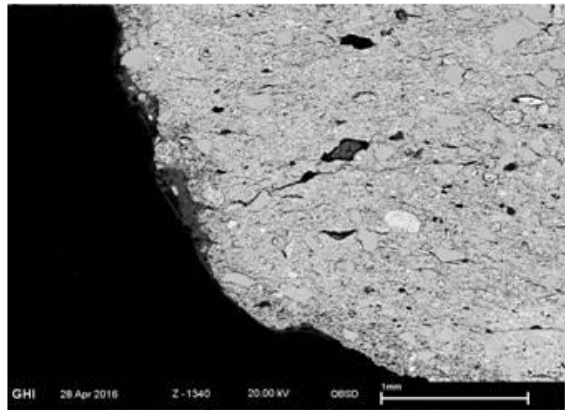
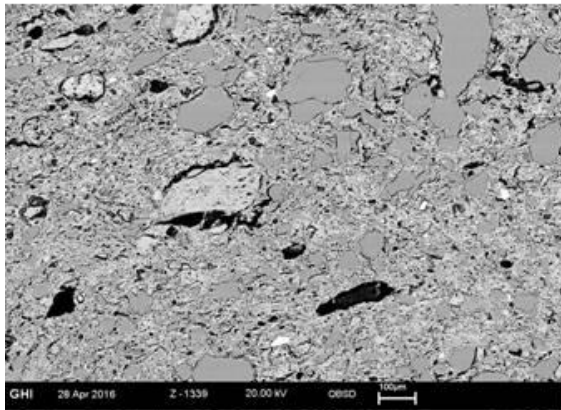
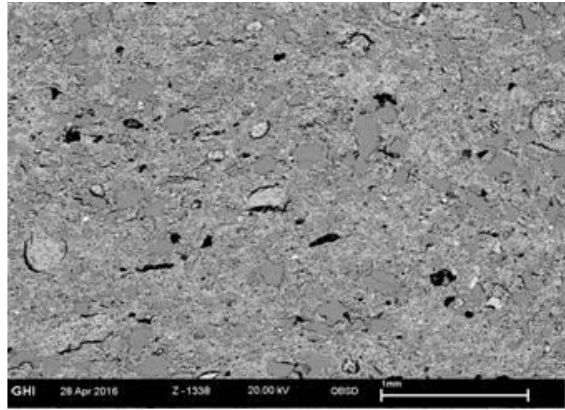
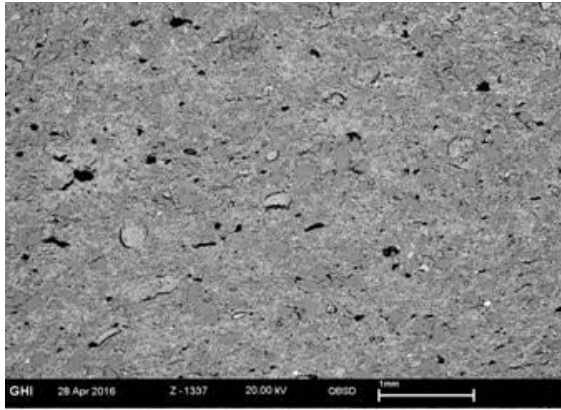
Sample UJ173



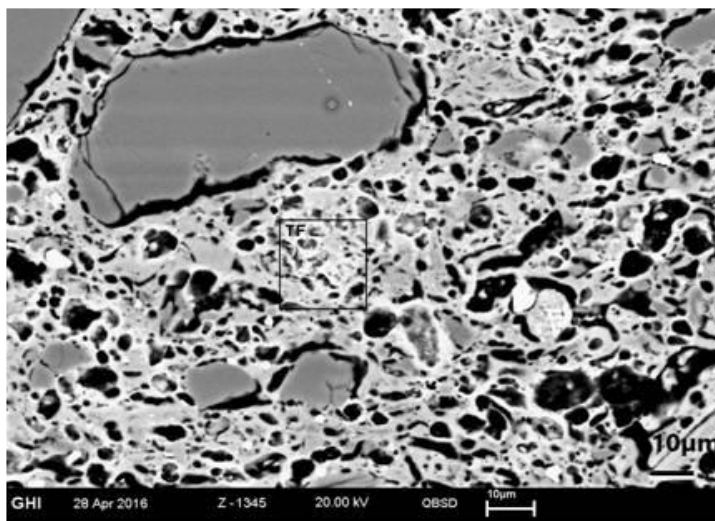
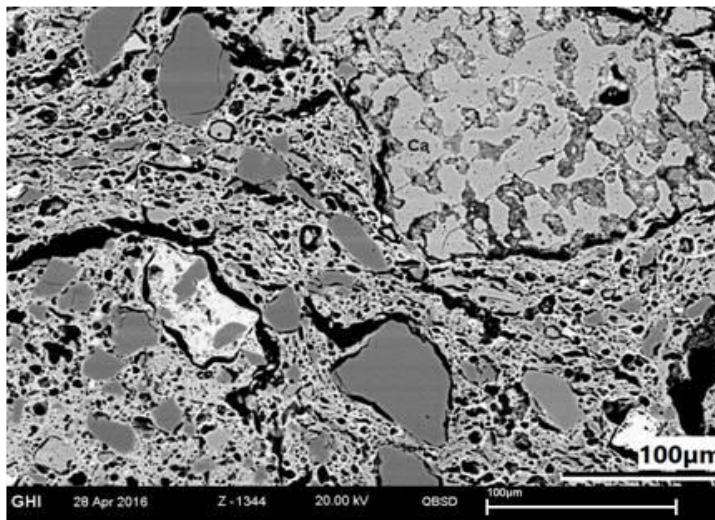
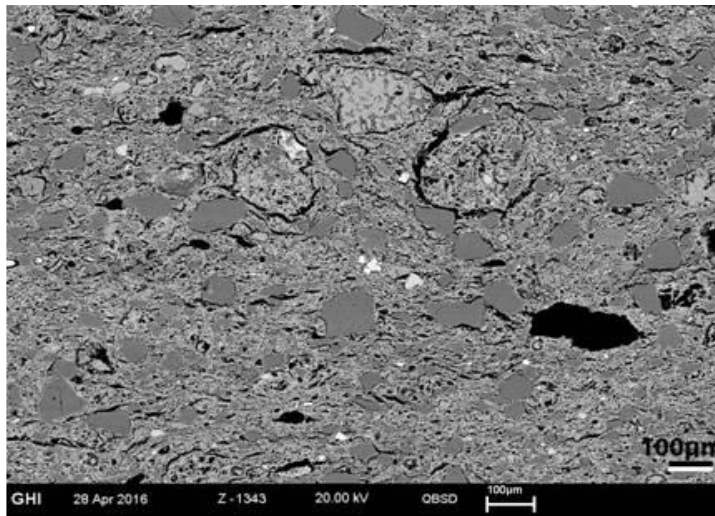
Sample UJ180



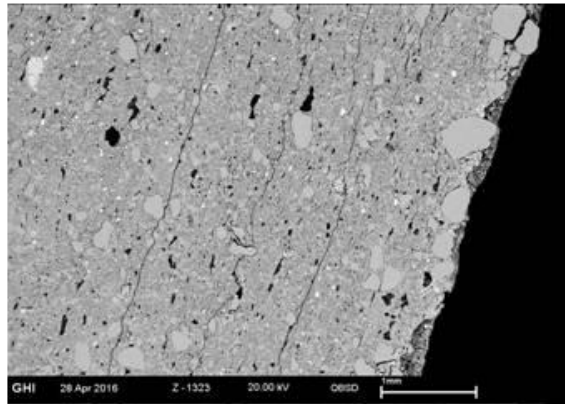
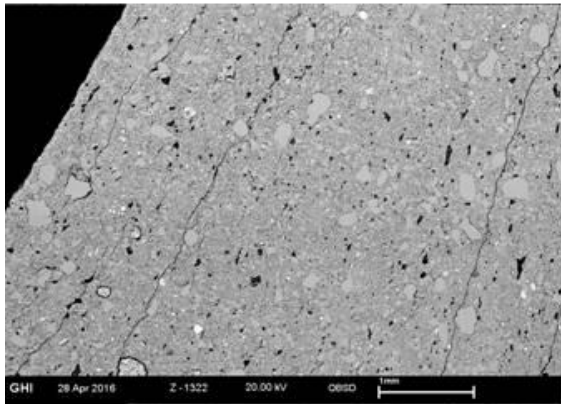
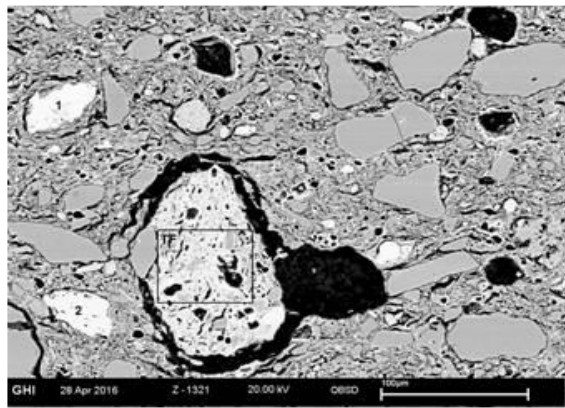
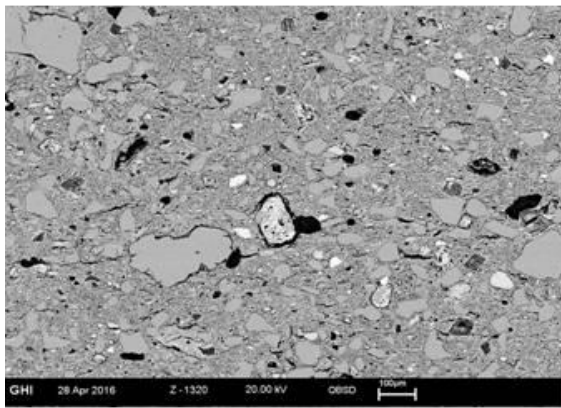
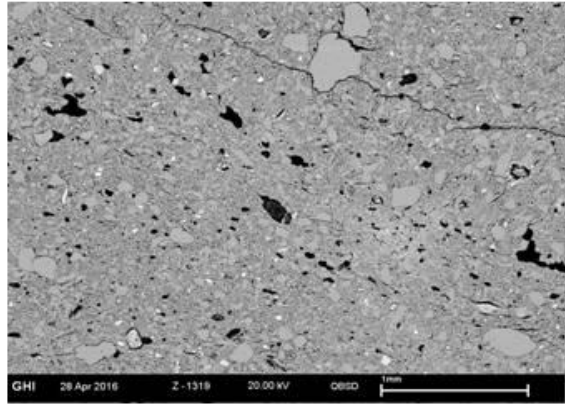
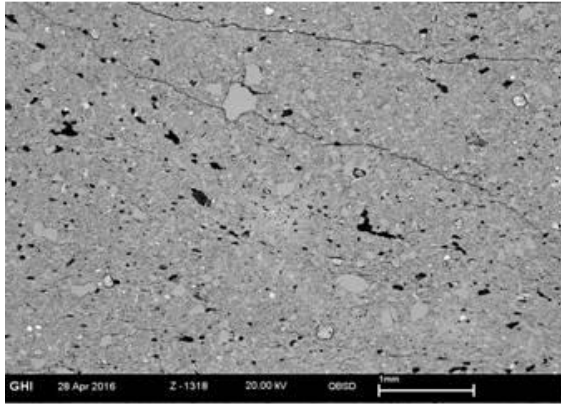
Sample UJ180



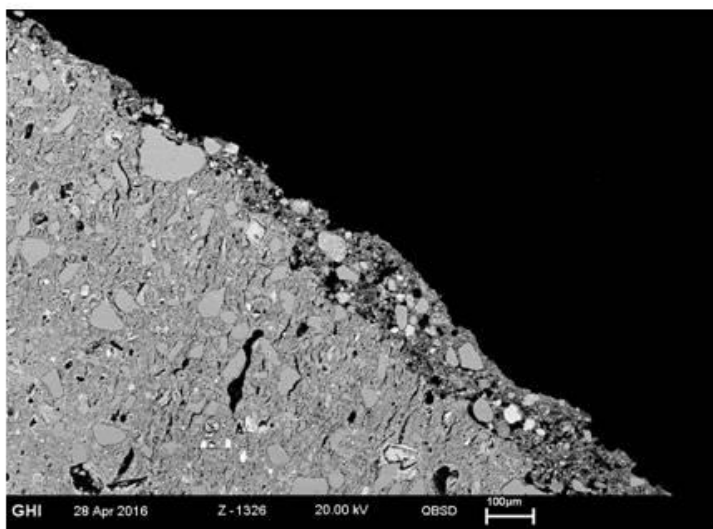
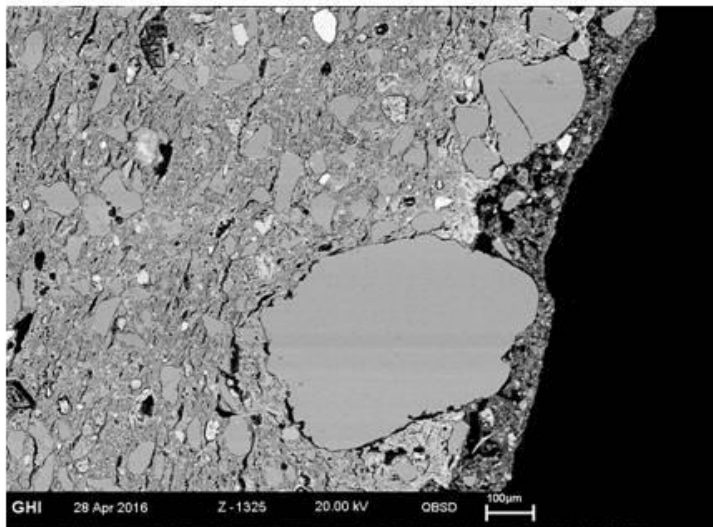
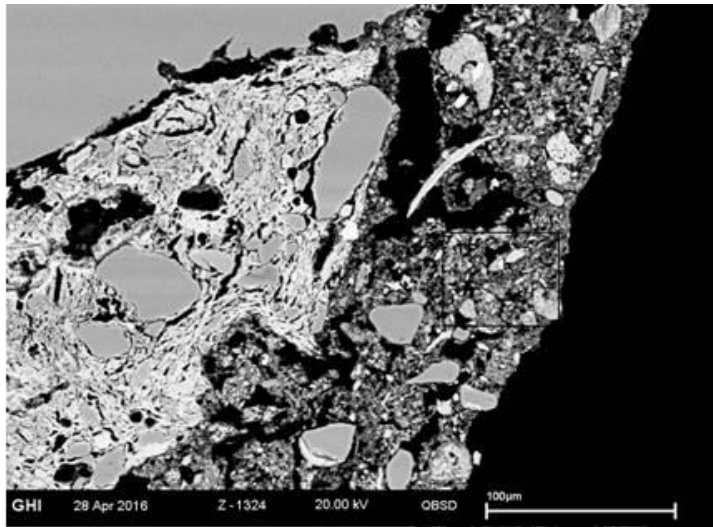
Sample UJ579



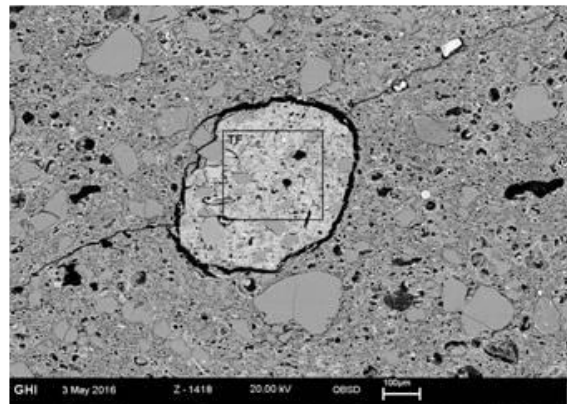
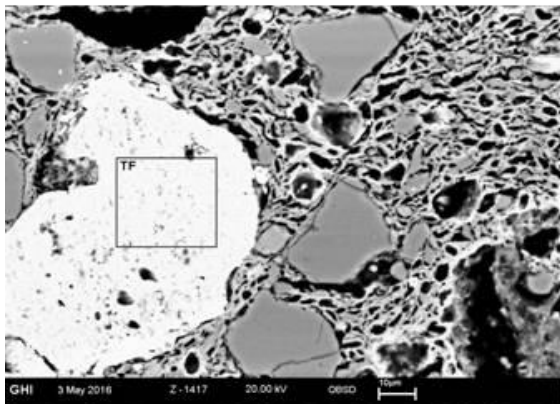
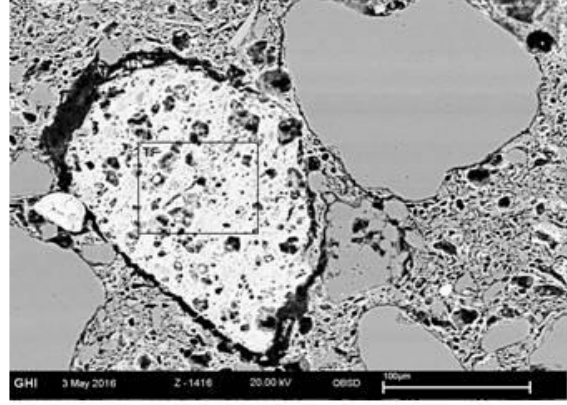
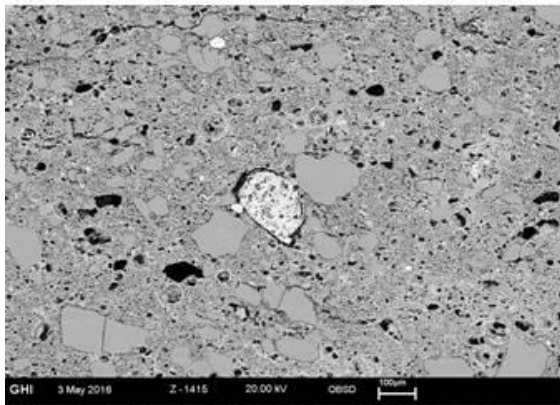
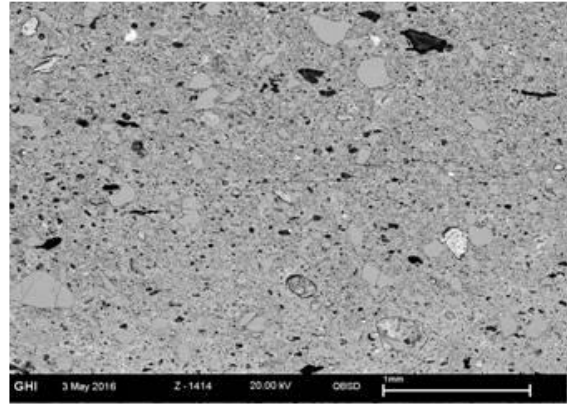
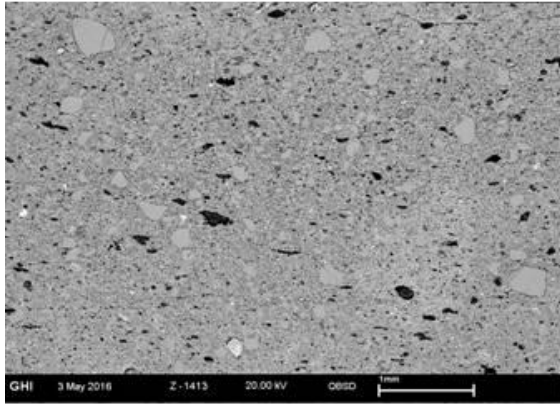
Sample UJ579



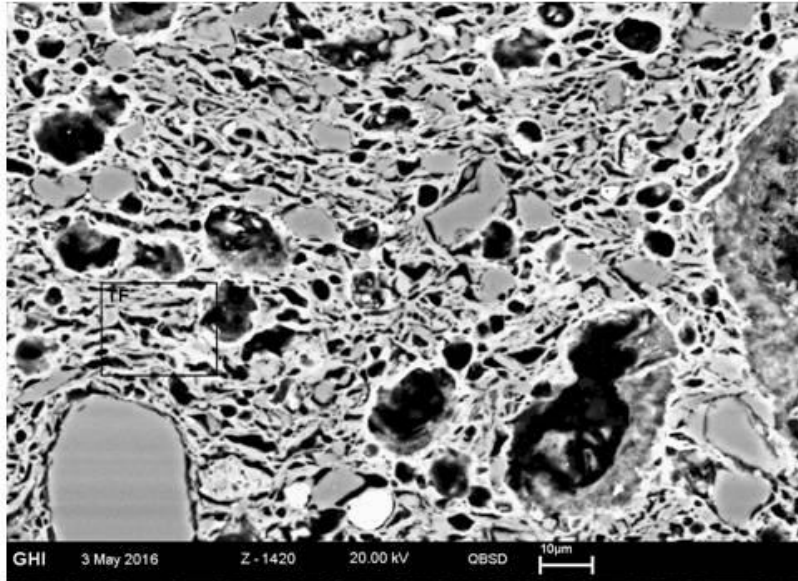
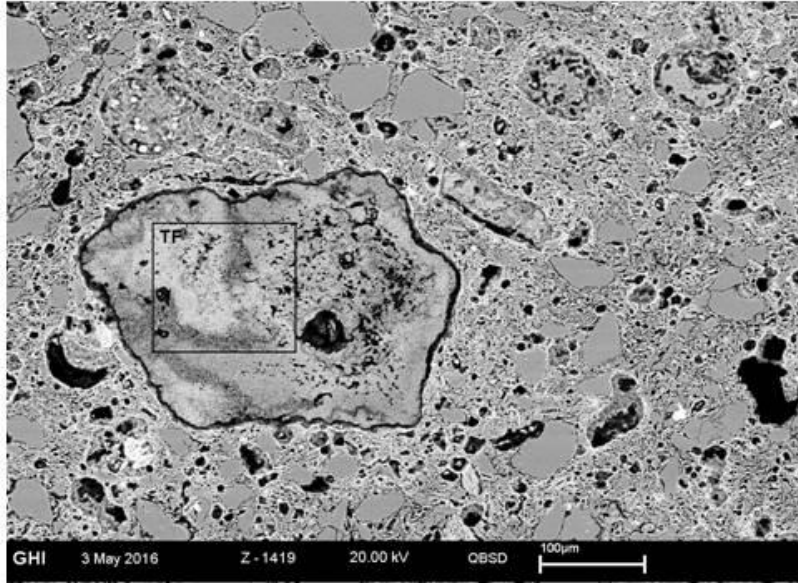
Sample UJ691



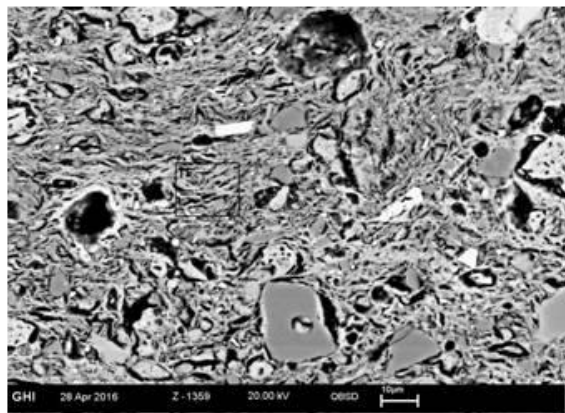
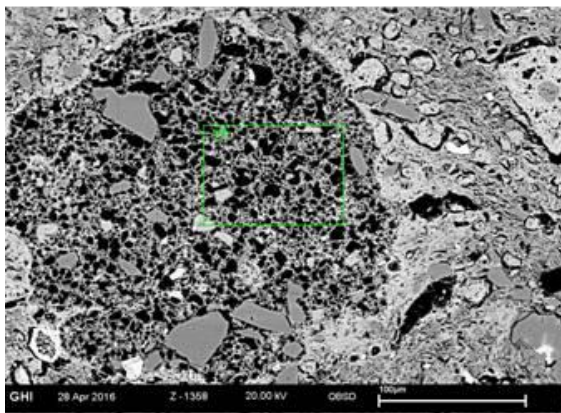
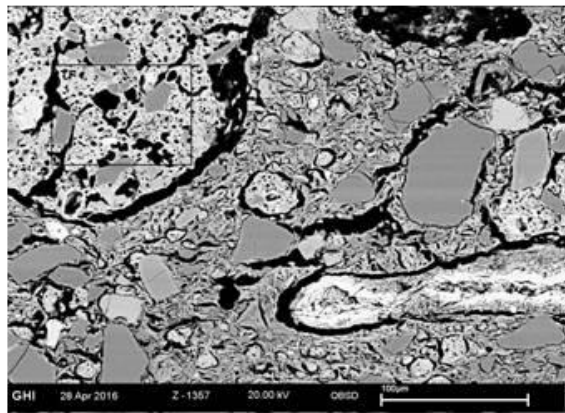
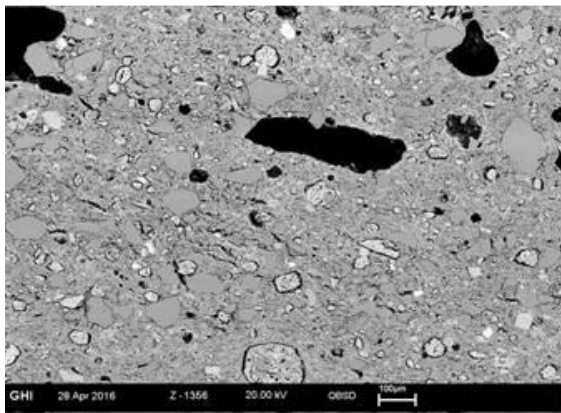
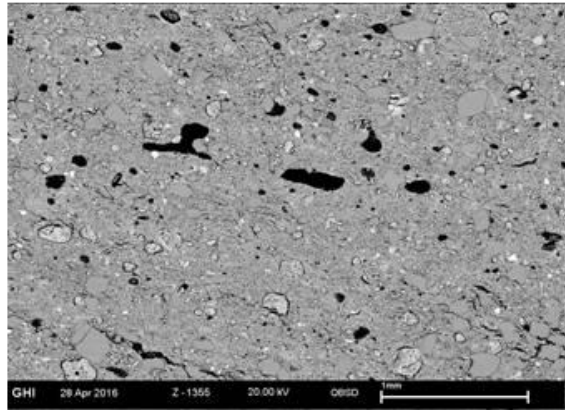
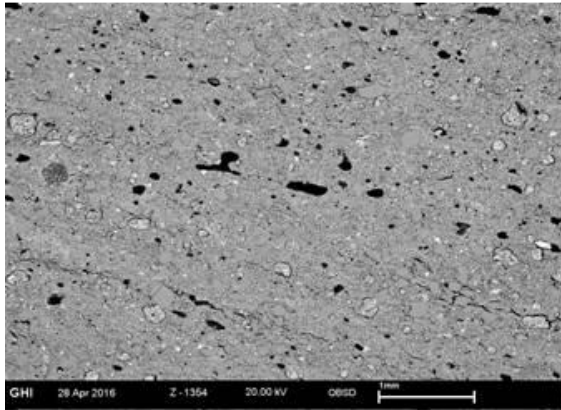
Sample UJ691



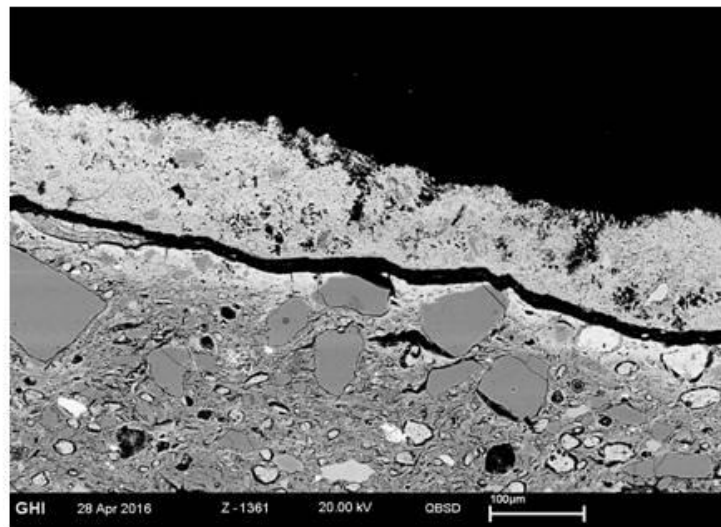
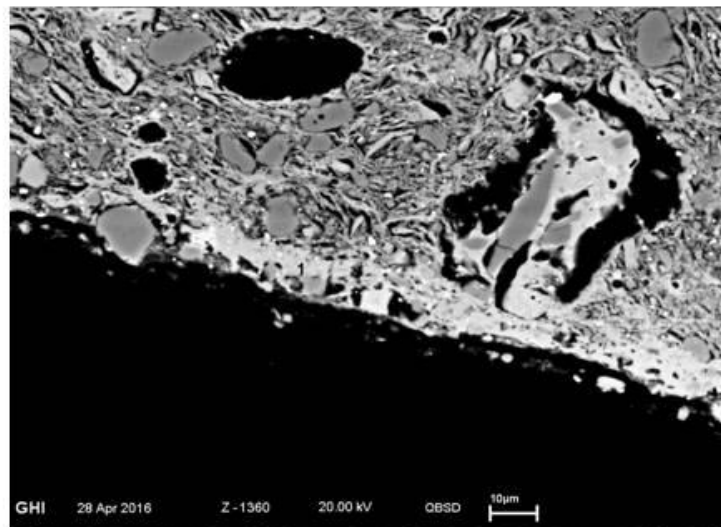
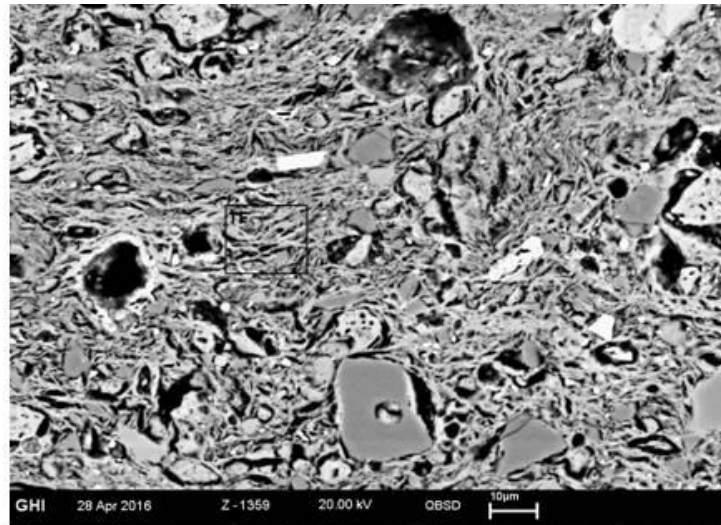
Sample UJ795



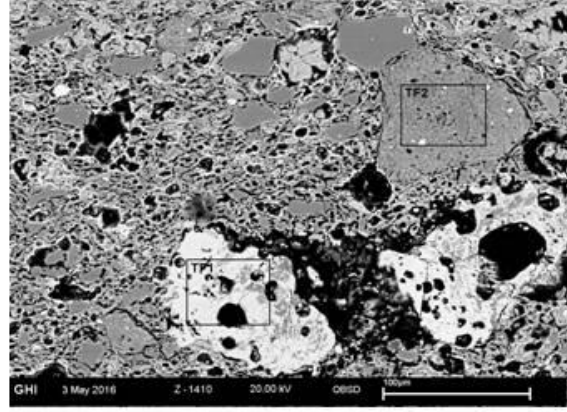
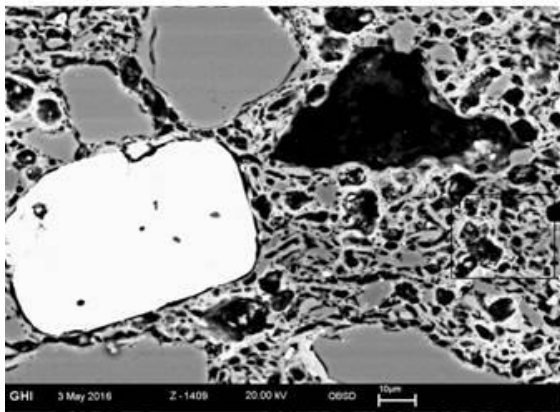
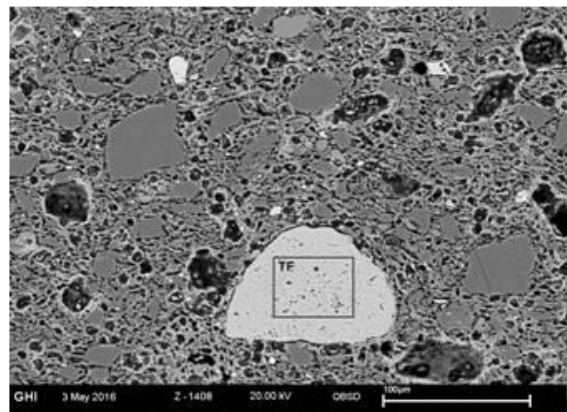
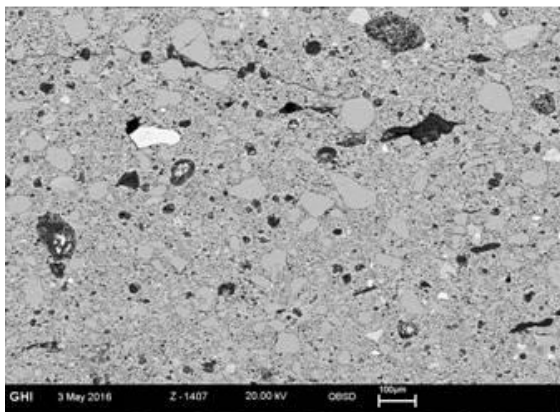
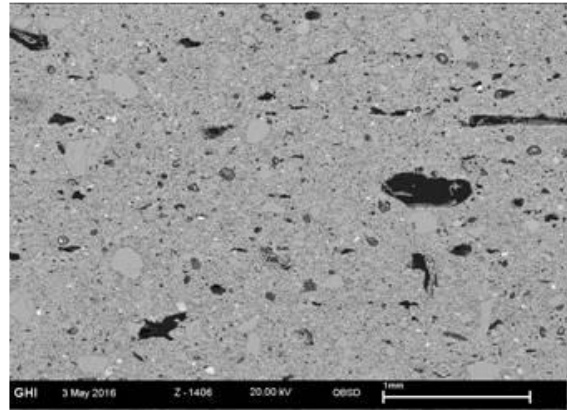
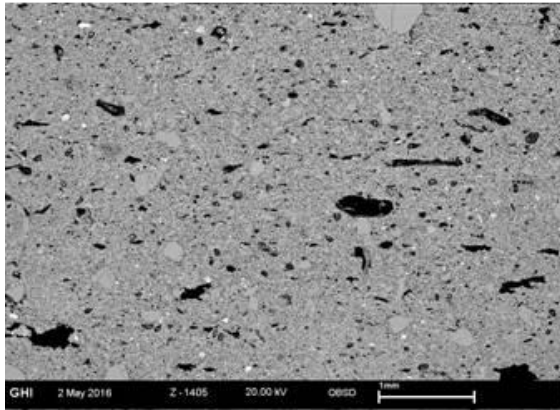
Sample UJ795



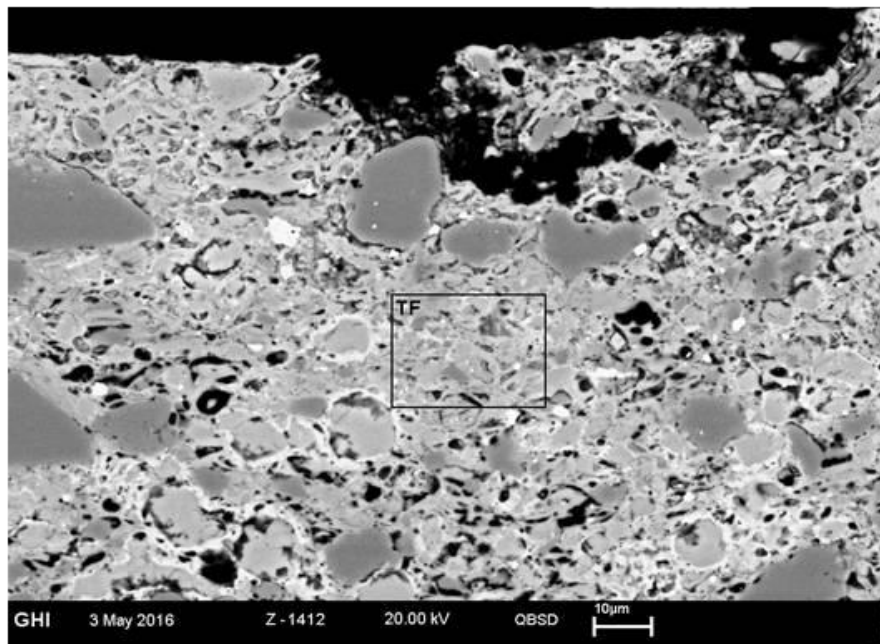
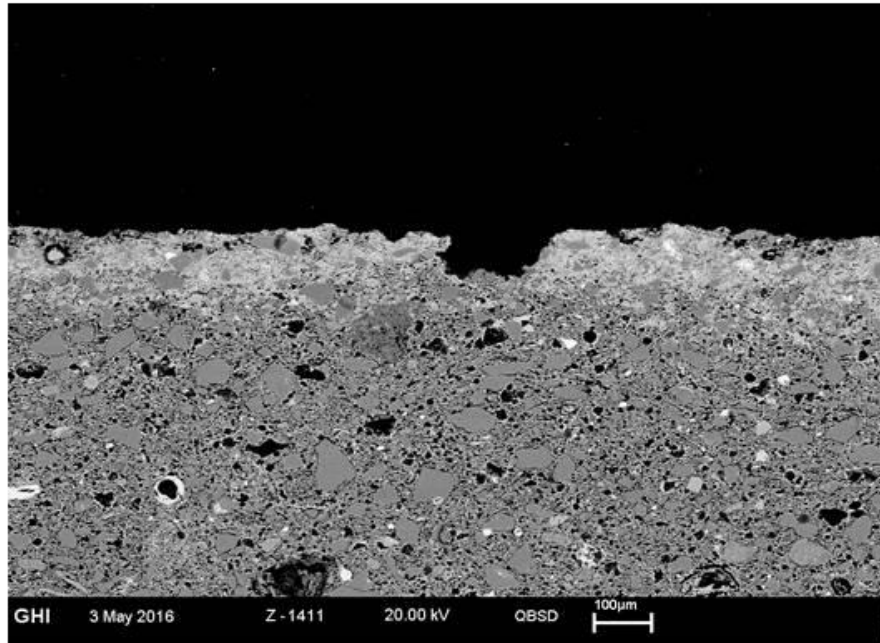
Sample UJ931



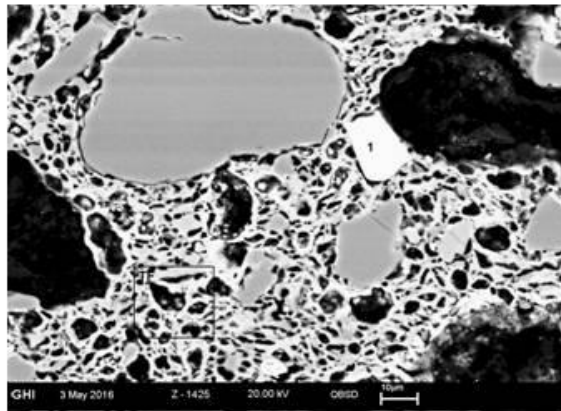
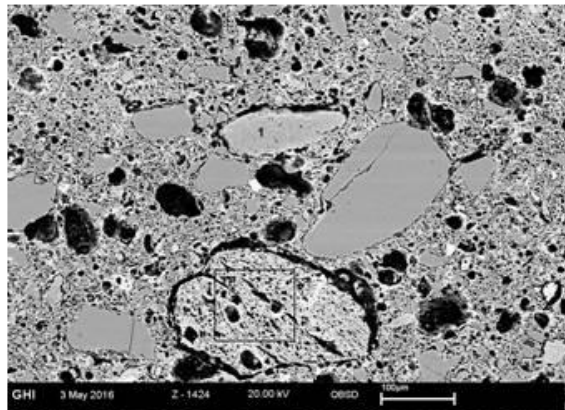
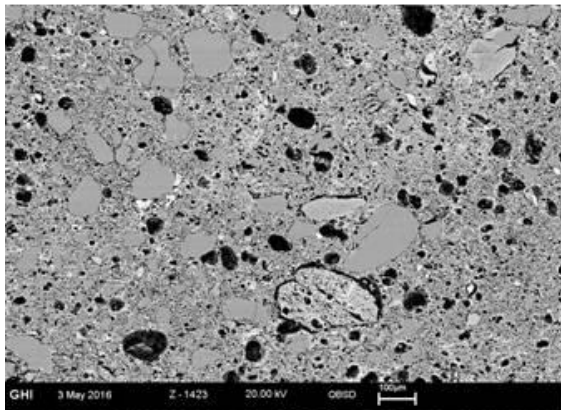
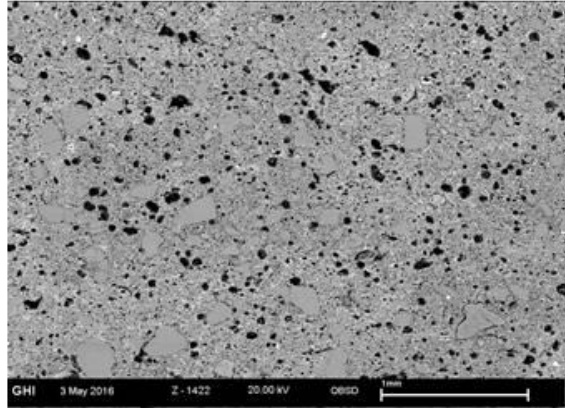
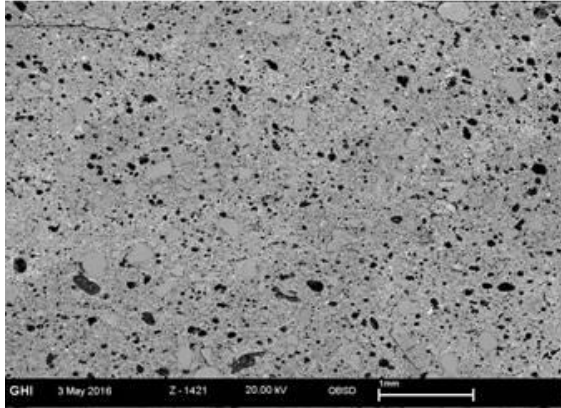
Sample UJ931



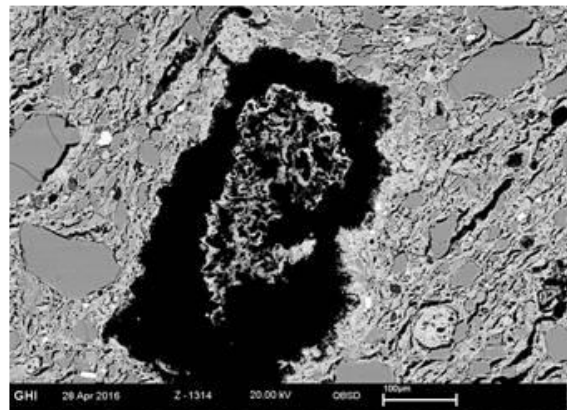
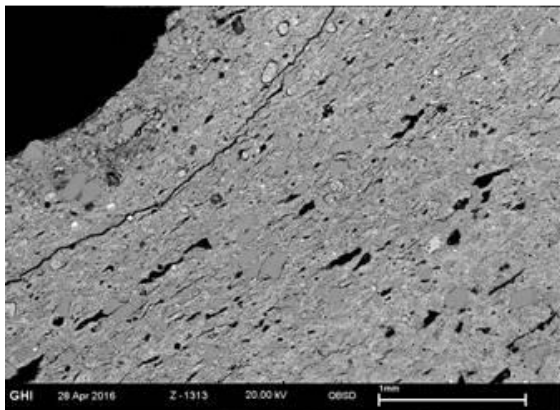
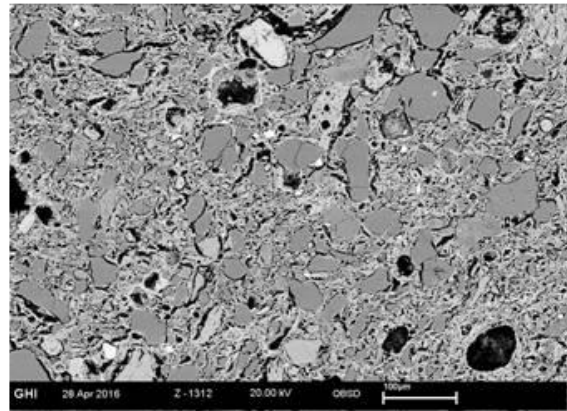
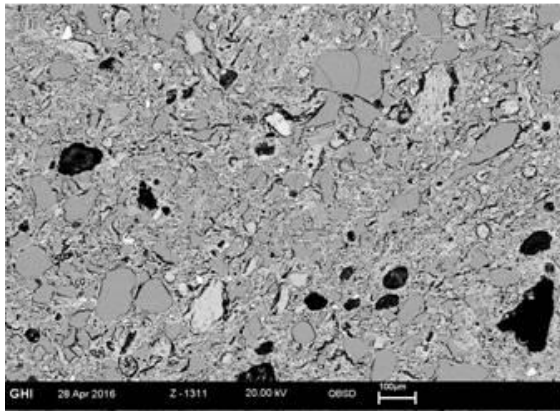
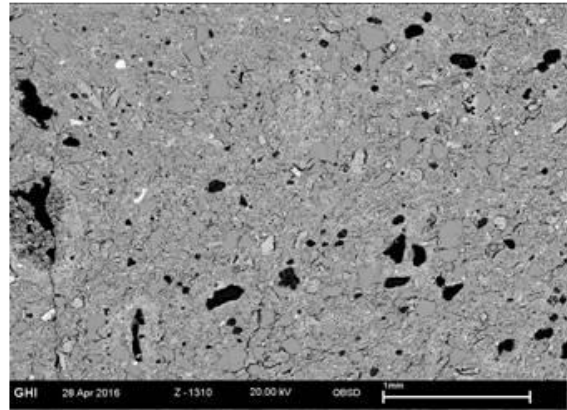
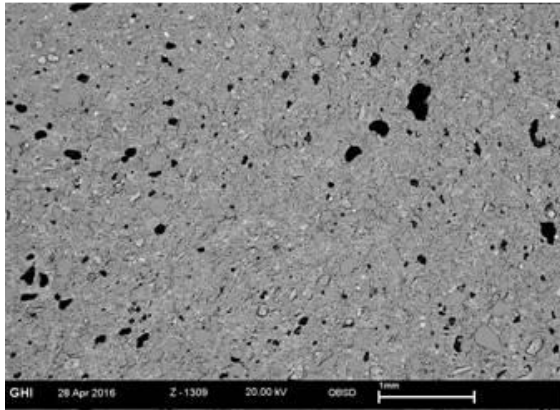
Sample UJ978



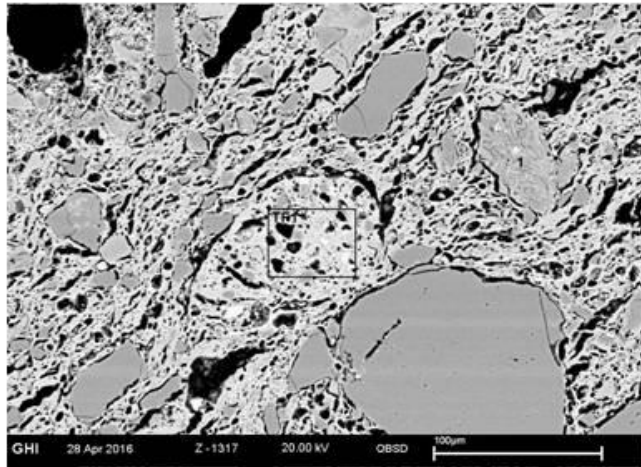
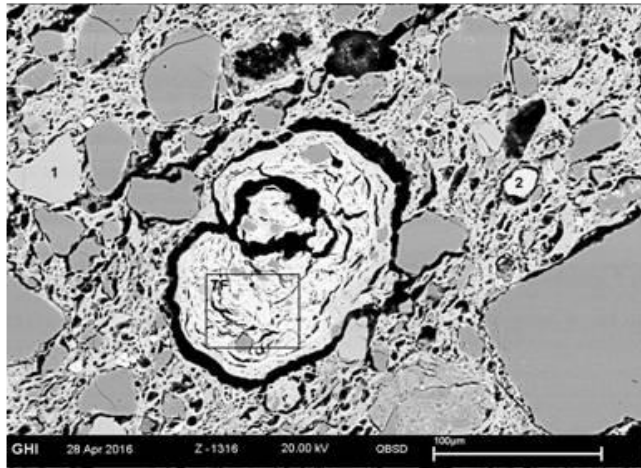
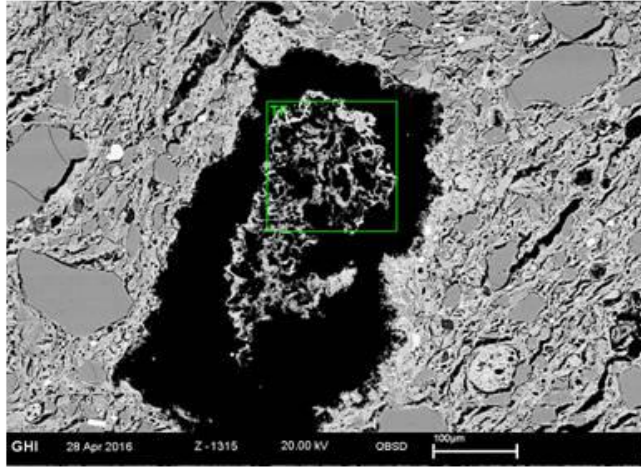
Sample UJ978



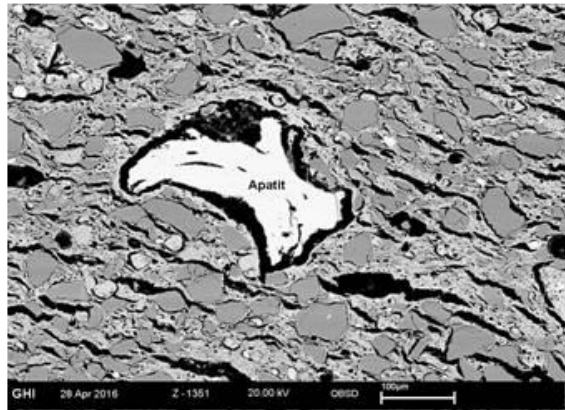
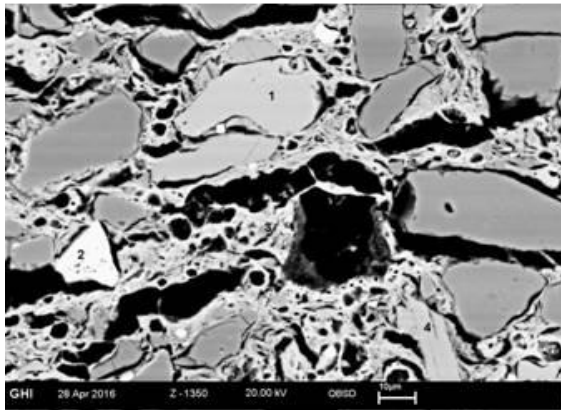
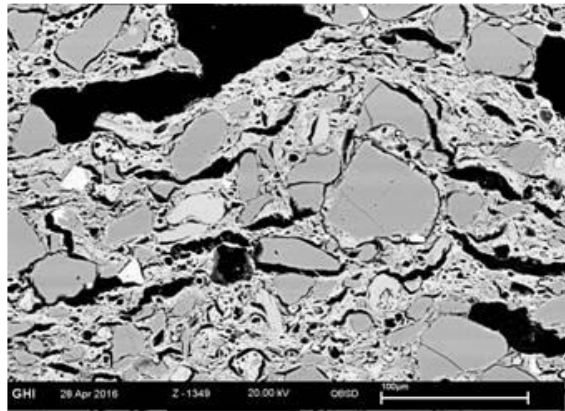
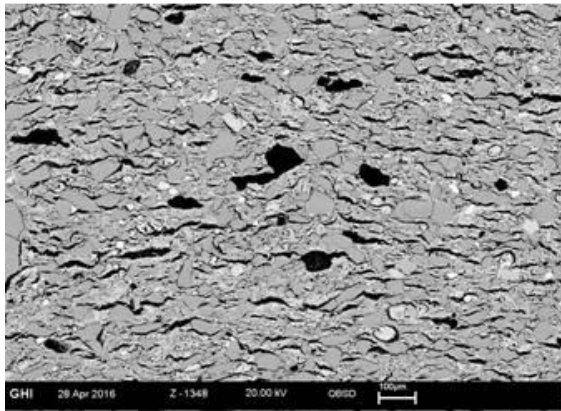
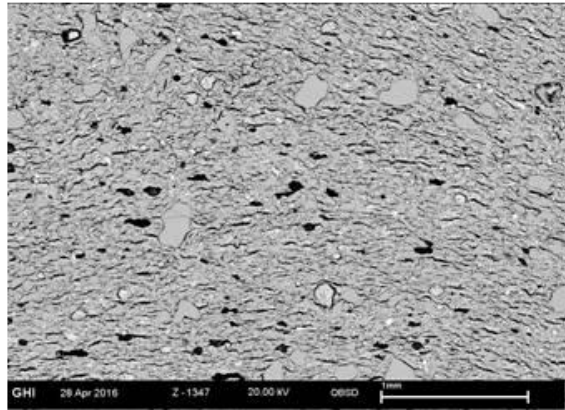
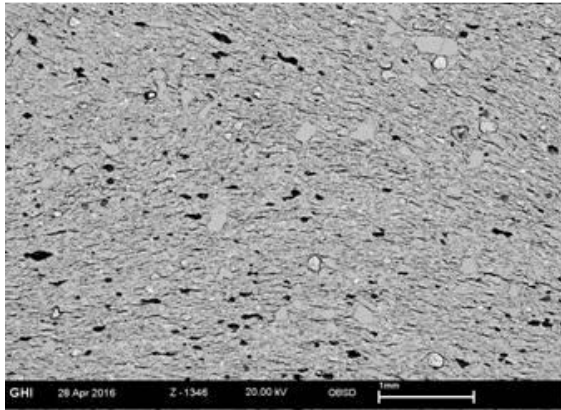
Sample UJ1026



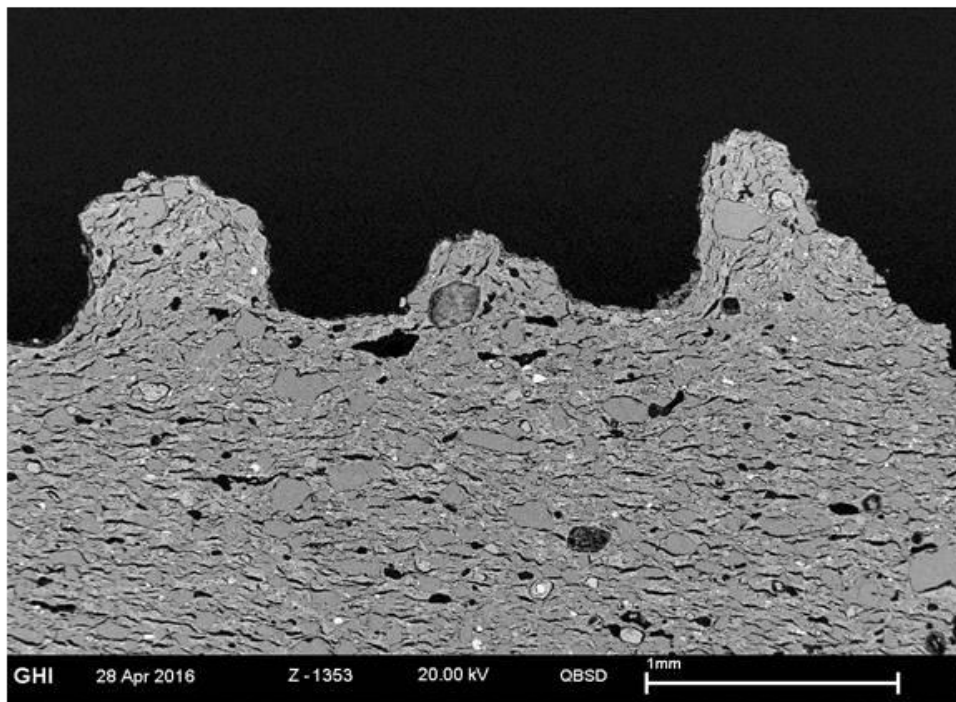
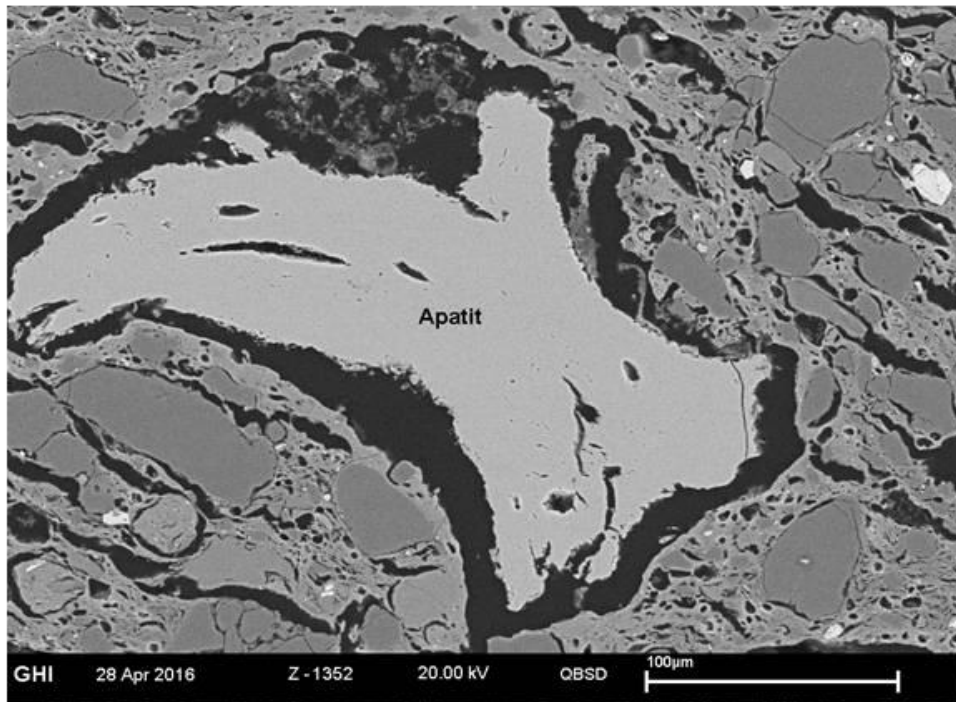
Sample UJ1041



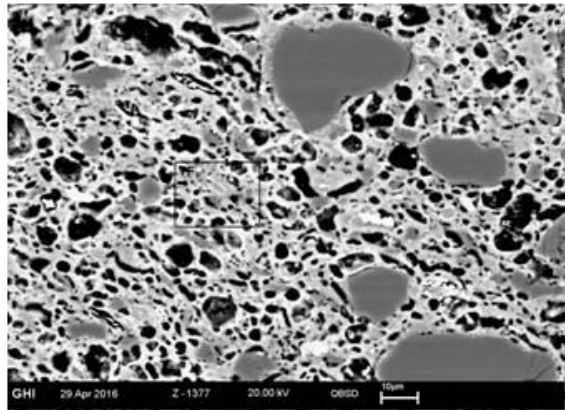
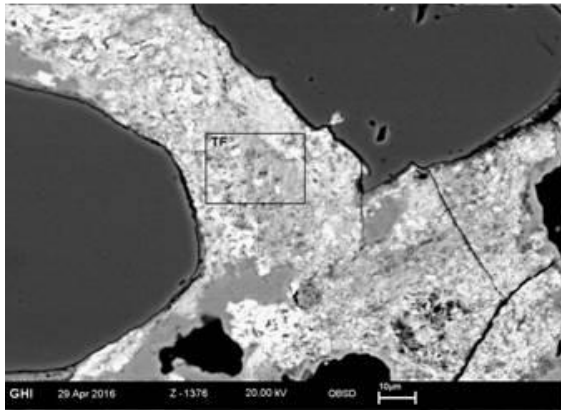
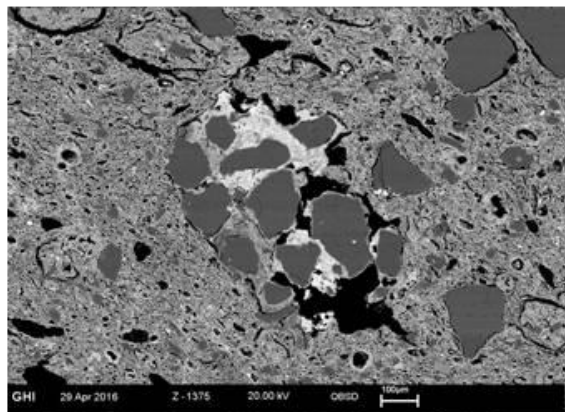
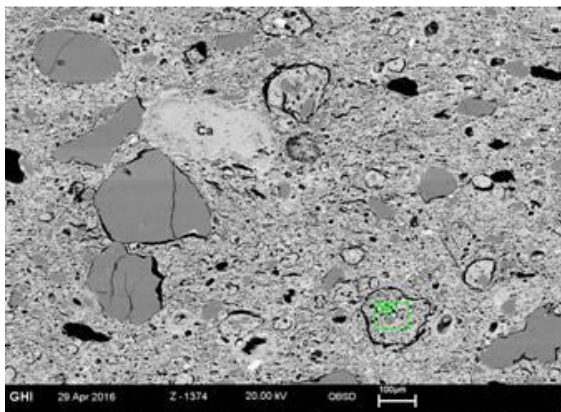
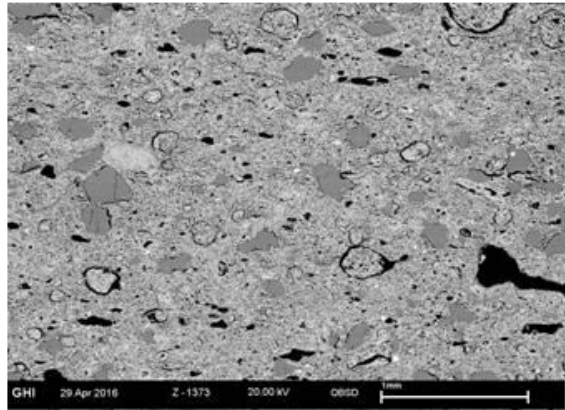
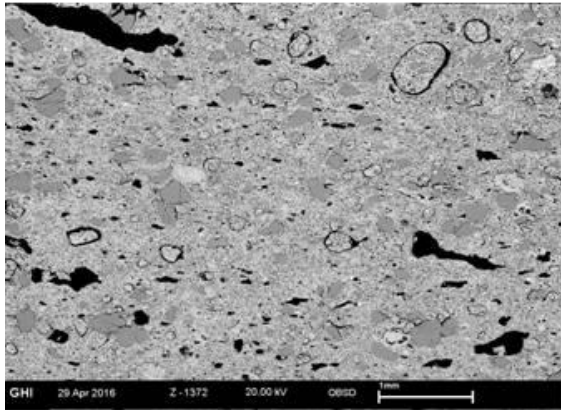
Sample UJ1041



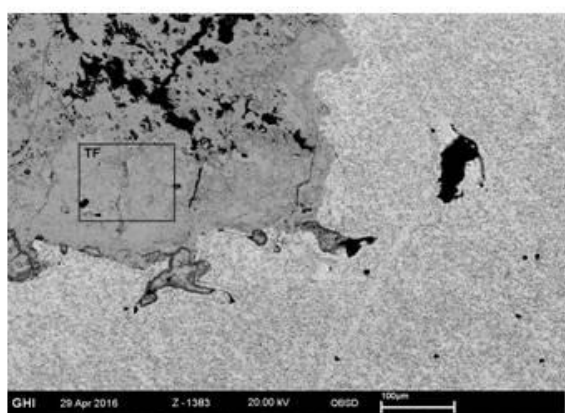
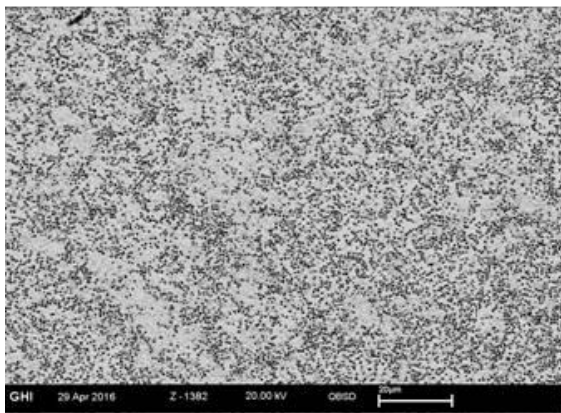
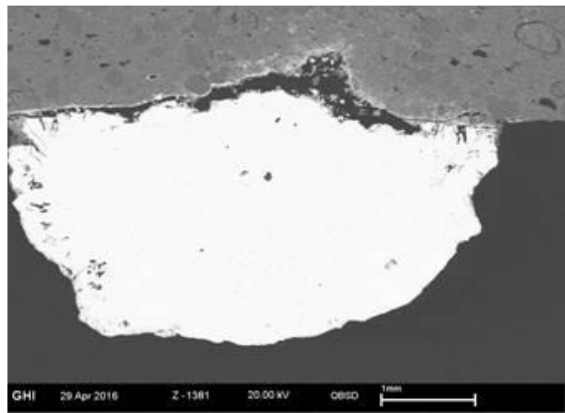
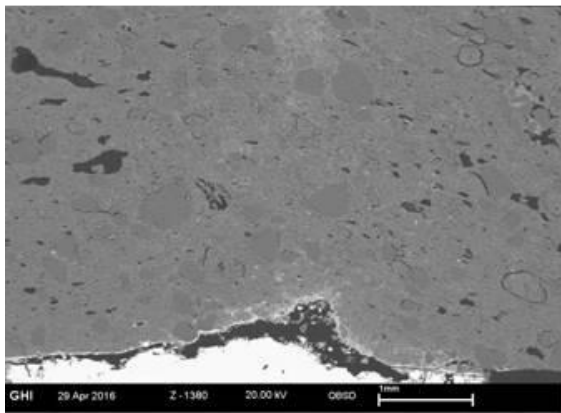
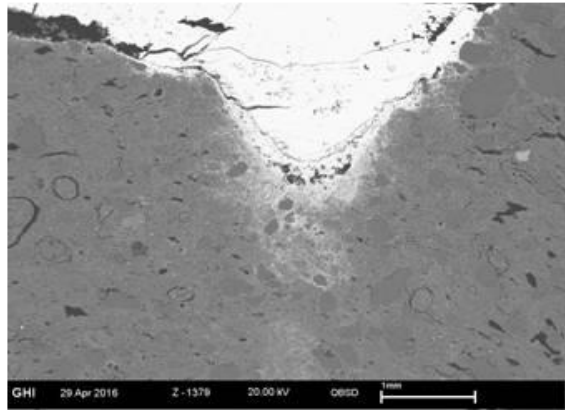
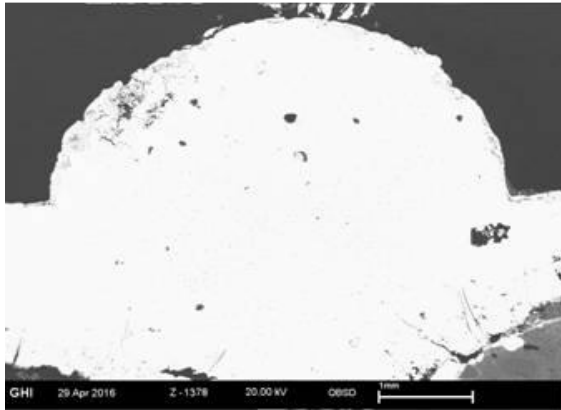
Sample UJ1053



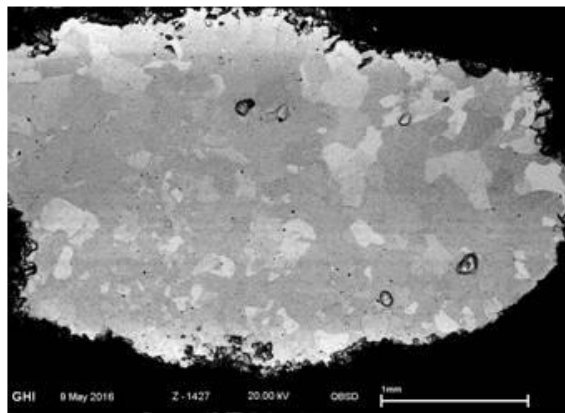
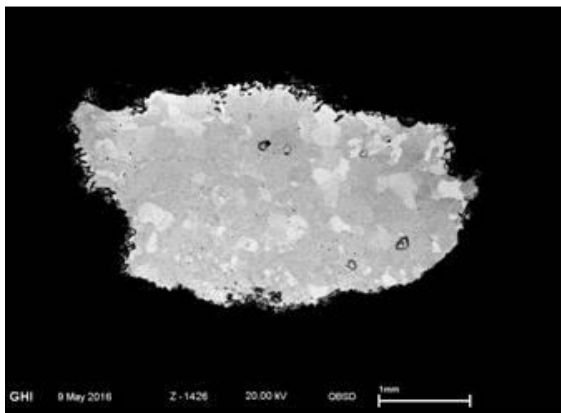
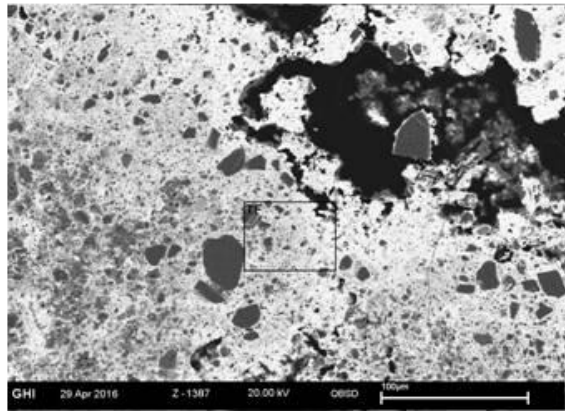
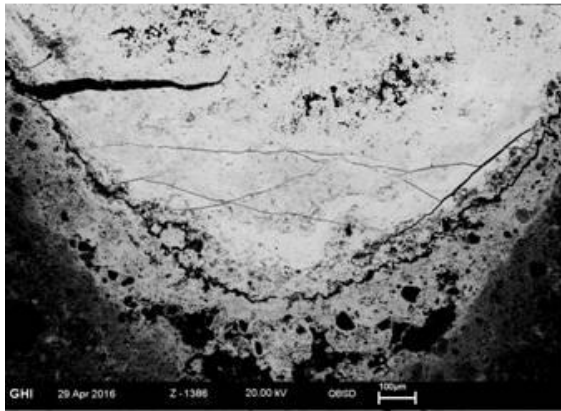
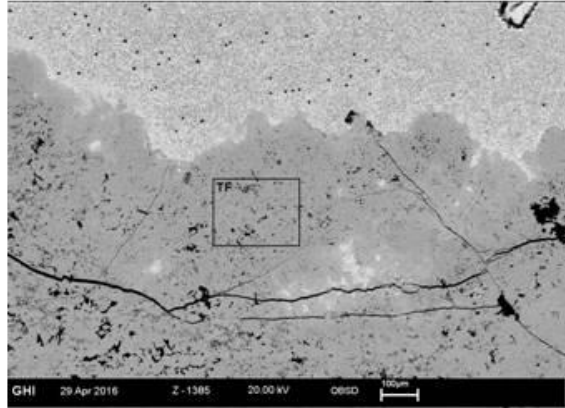
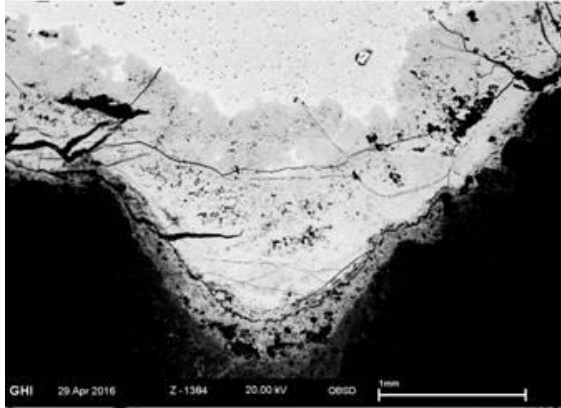
Sample UJ1053



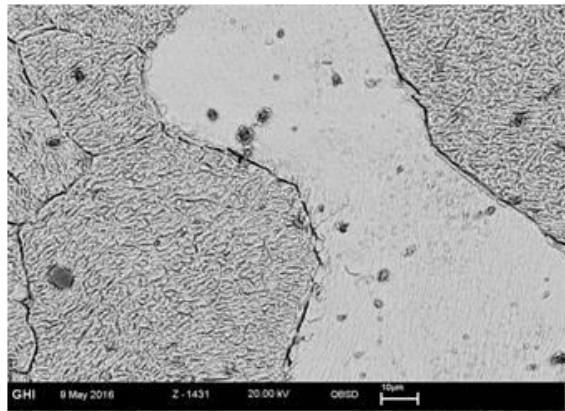
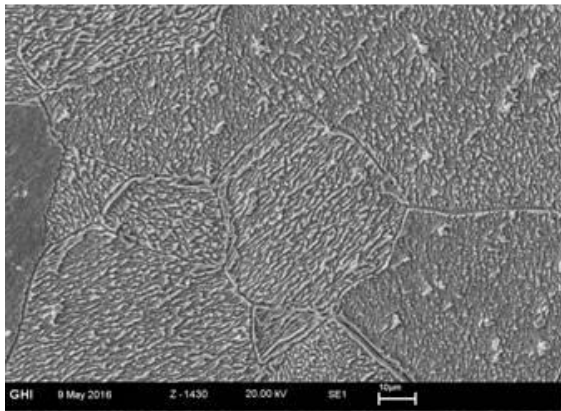
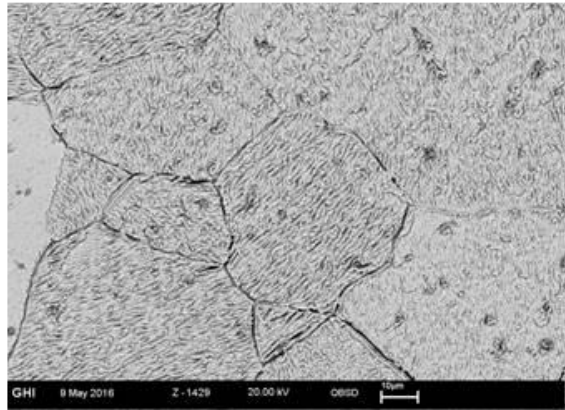
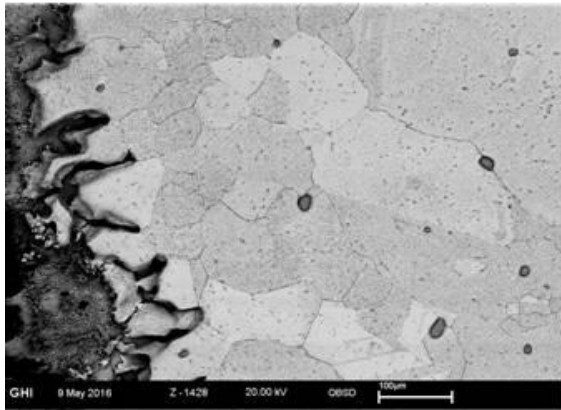
Sample UJ1064



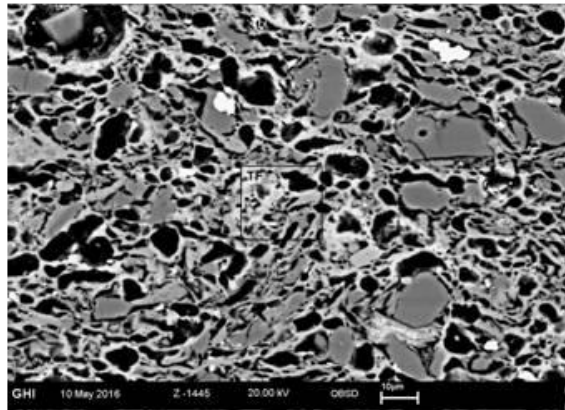
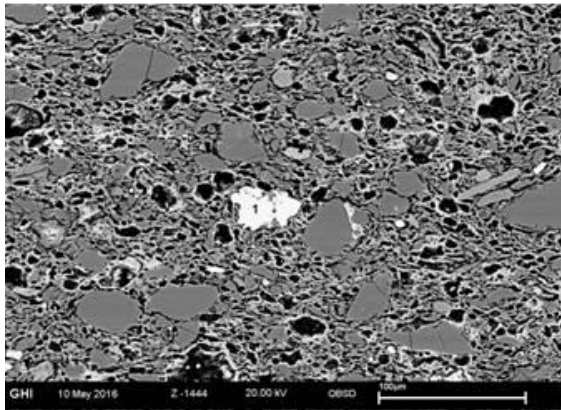
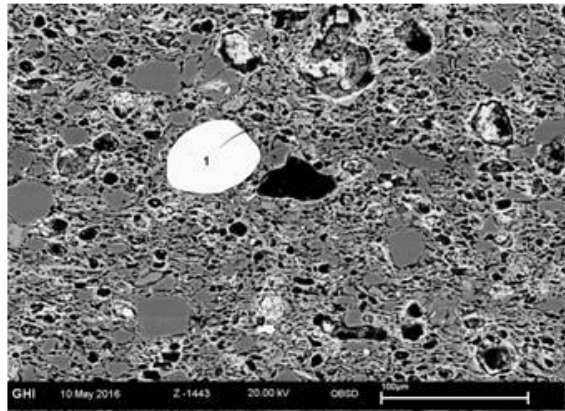
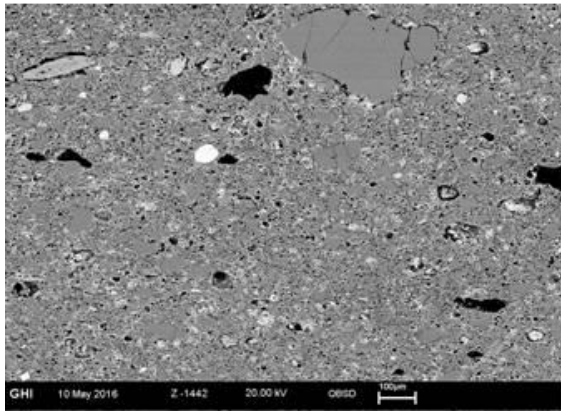
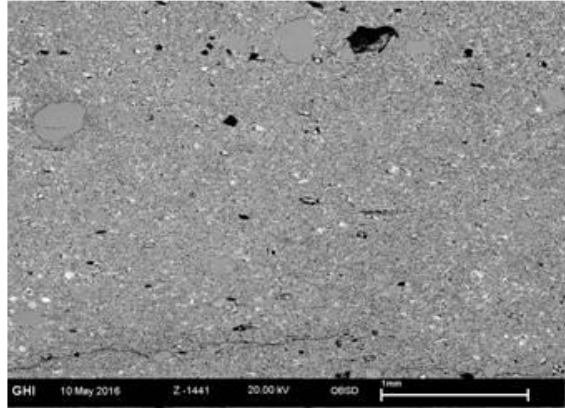
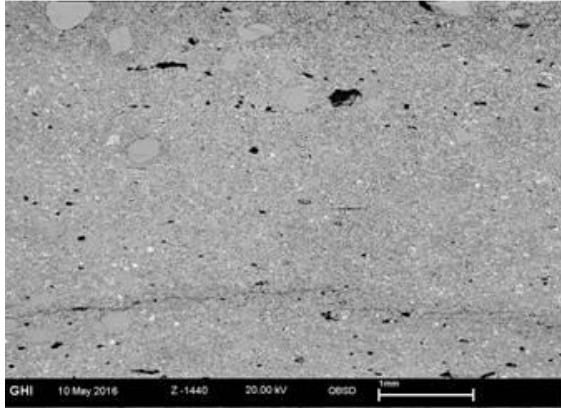
Sample UJ1064



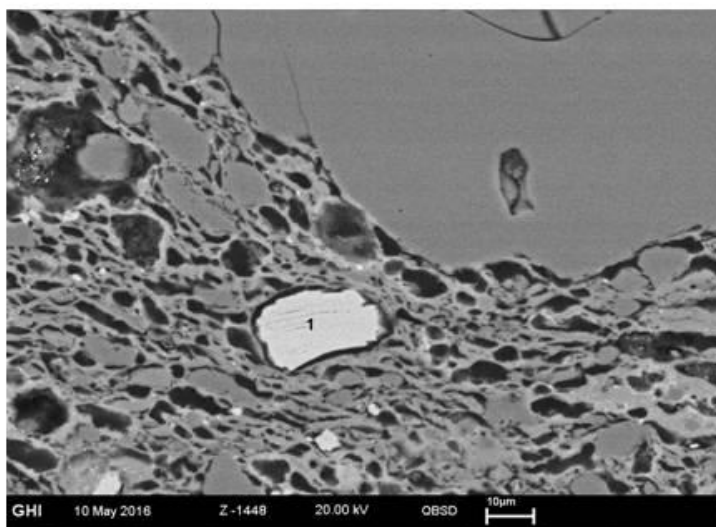
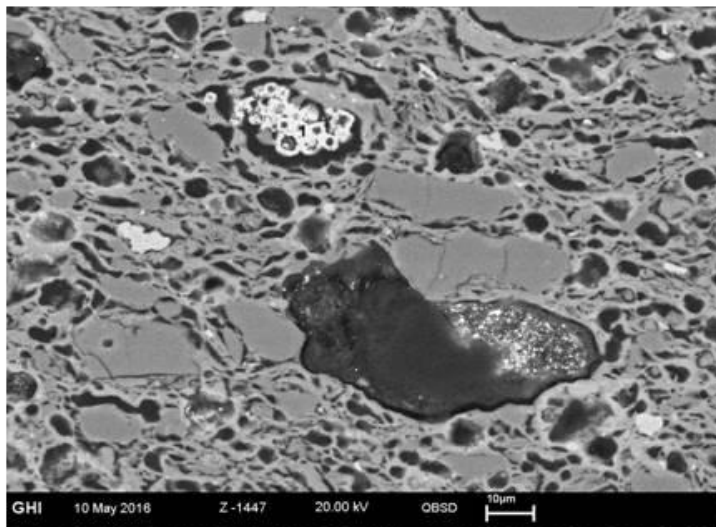
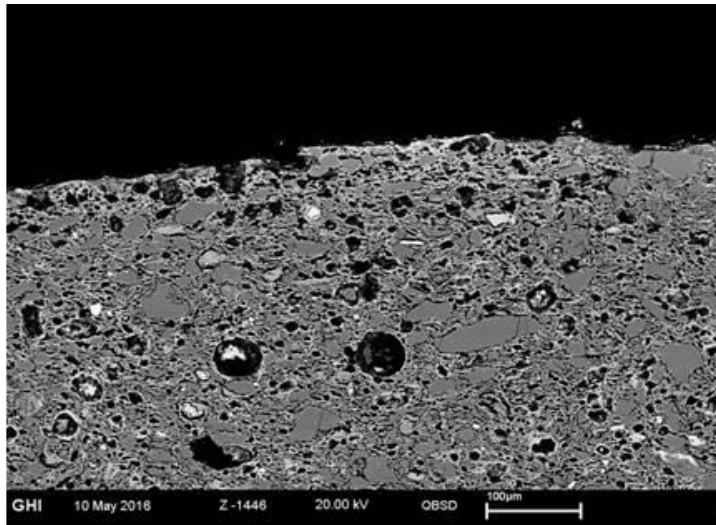
Sample UJ1064



Sample UJ1064



Sample UJ1090



Sample UJ1090

J.3: EDX area analysis results

sample No.	EDX area analysis [at%]					
	Si	Al	Ca	Fe	Mg	Na+K
AB285	23.8	7.5	0.9	1.3	0.6	1.2
AB350	15.6	7.3	7.9	1.8	1	1.6
AB291	21.9	9.9	0.4	1.4	0.3	0
AB392	17.9	2.4	8.3	1.8	7.5	0.4
AB451	20.6	6.1	3.4	2.4	1.3	0
AB510						
UQ483	14.7	6.8	8.2	2.2	0.5	1.1
UQ509	22.4	7.7	3.7	1	0	0.6
UQ522	16.2	7.4	6.3	1.7	1.8	1.8
UQ362	21.5	6.1	3.1	2.4	1.4	1.3
UQ476	16.8	7.7	9	1.5	0.9	1.9
UQ400	15.9	7.2	8.9	1.7	0	1.6
UQ57	22.4	10.5	0.4	1.1	0.6	1.9
UQ165	23.5	9.1	0.6	2.1	0.4	1
UQ241	12.5	5.7	10.8	1	0.8	0.6
UQ120	22.6	7.6	0.8	2.2	0.3	0.7
UQ183	22.7	7.7	5.2	2.4	0.9	1.1
UQ220	23.4	7.8	3	2.6	1	1.5
UQ81	24.5	9	1	1.1	0.7	1.3
UQ185	17.9	6.8	8.4	2	1.1	1.1
UQ229	22.3	8.1	4.4	2.4	1	1.7
UQ152	23.9	7.6	0.6	1.8	0	0.7
UQ319	16.2	7.7	6.4	1.5	0.8	1.8
UJ579	30.5	6.6	4.9	1.4	0.9	0.8
UJ634	25.8	7.8	0.6	1.6	0.5	0.7
UJ859	25.6	5.7	4.2	1.4	1.0	1.1
UJ931	26.0	8.5	0.7	1.9	0.5	0.8
UJ1041	25.3	6.3	2.7	1.4	0.7	1.0
UJ1053	26.3	6.4	1.4	1.3	0.7	0.7
UJ1064	19.7	6.1	6.2	1.9	1.0	1.3
UJ98	21.0	7.1	4.3	1.5	1.0	1.4
UJ691	25.7	7.4	1.5	1.0	0.5	1.2
UJ795	23.4	7.6	5.0	0.9	0.4	0,8 no Na
UJ978	22.1	7.6	5.5	0.9	0.5	1.1
UJ26	22.0	7.6	7.1	1.1	0.5	0,8 no Na
UJ1090	23.3	7.8	4.7	0.8	0.8	1.4
UJ148	21.5	7.2	4.7	1.3	0.5	0.8

UJ144	23.6	6.7	1.5	3.1	0.0	1,0 no Na
UJ150	24.3	5.6	0.3	1.1	0.8	0.7
UJ173	19.6	5.9	0.5	2.2	0.4	0,7 no Na
UJ859	25.6	5.7	4.2	1.4	1.0	1.1
UJ931	26.0	8.5	0.7	1.9	0.5	0.8
UJ1041	25.3	6.3	2.7	1.4	0.7	1.0
UJ1053	26.3	6.4	1.4	1.3	0.7	0.7
UJ1064	19.7	6.1	6.2	1.9	1.0	1.3
UJ98	21.0	7.1	4.3	1.5	1.0	1.4