

## **SUPPLEMENTARY INFORMATION OF “OPEN DUMPING AND BURNING: AN OVERLOOKED SOURCE OF TERRESTRIAL MICROPLASTICS IN UNDERSERVED COMMUNITIES”**

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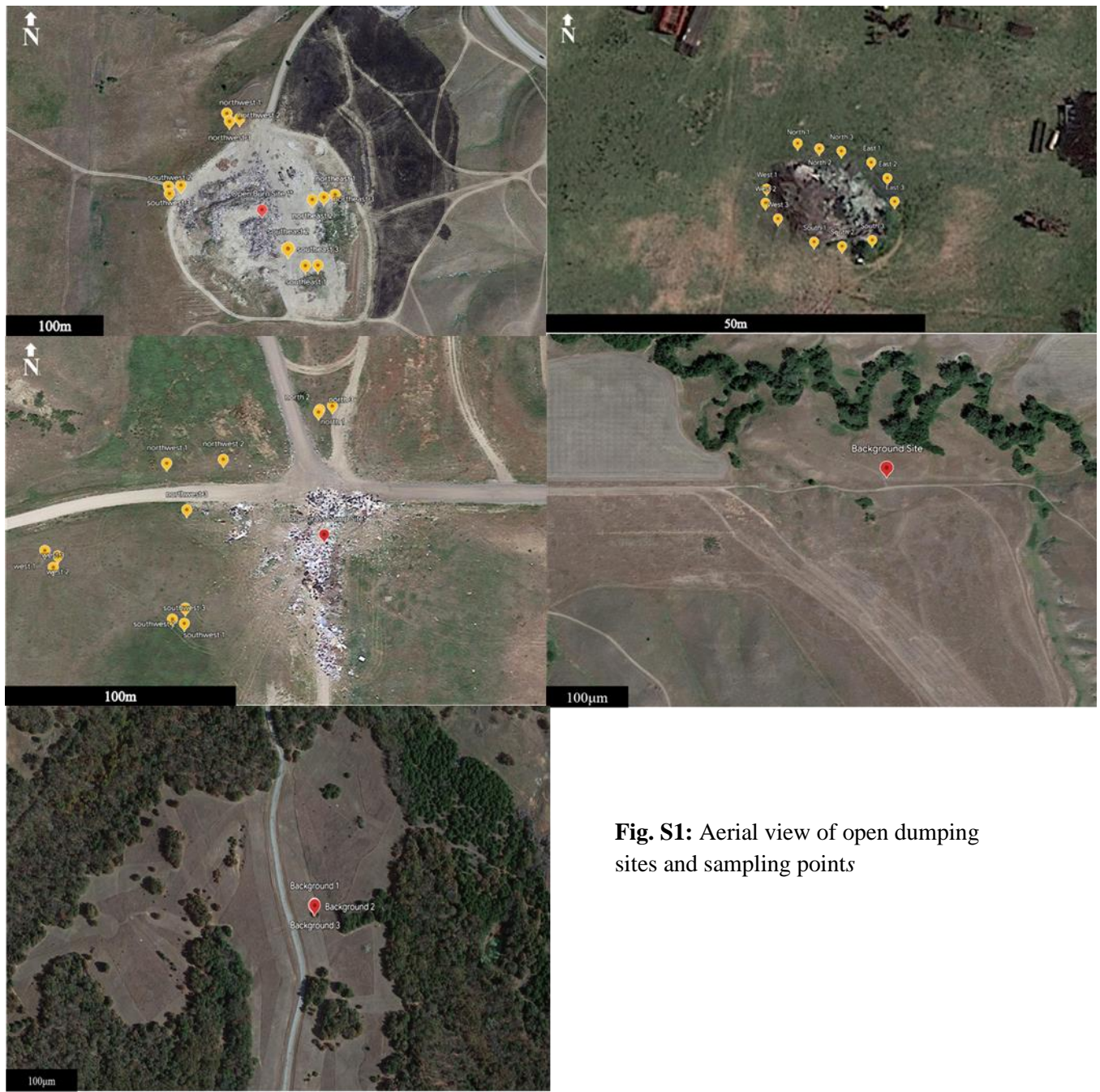
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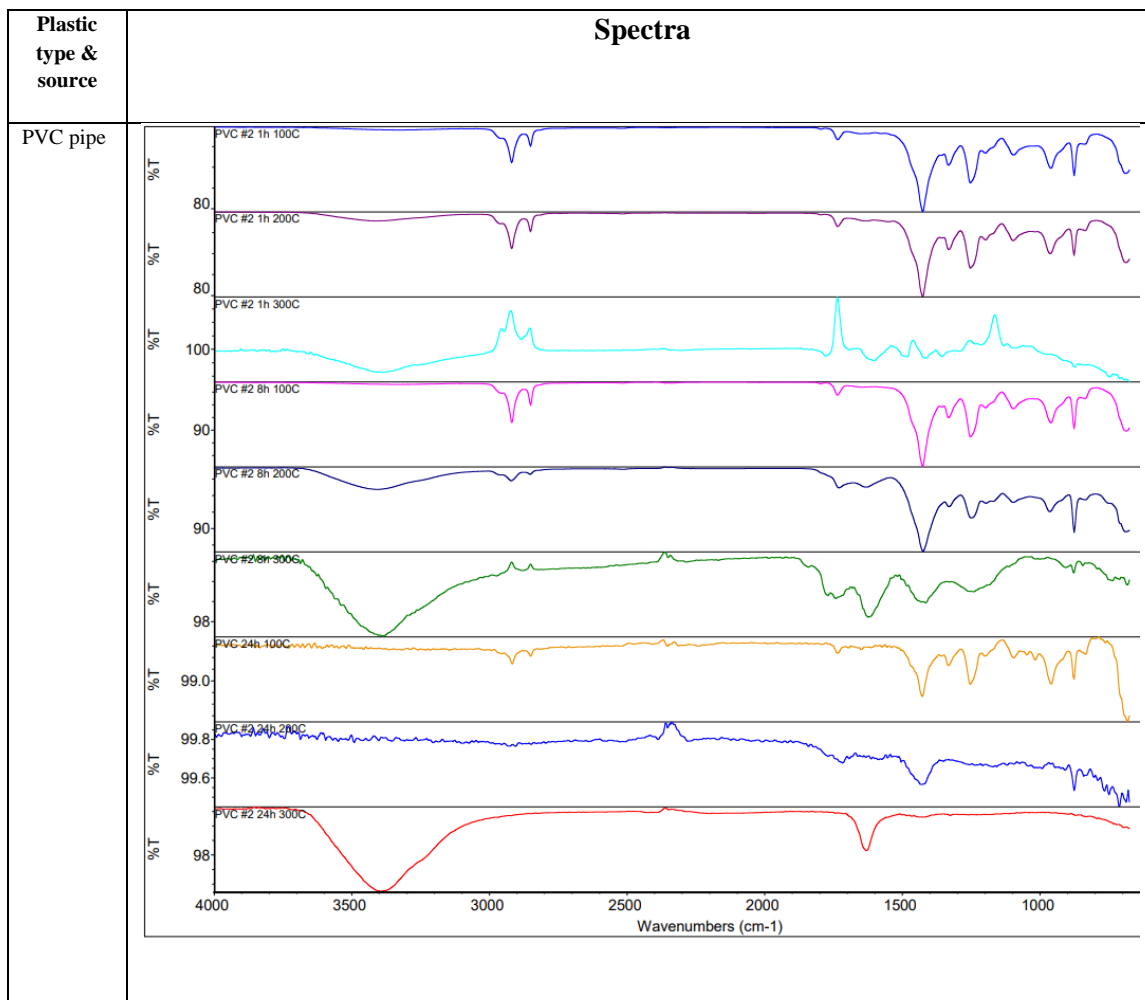


**Fig. S1:** Aerial view of open dumping sites and sampling points

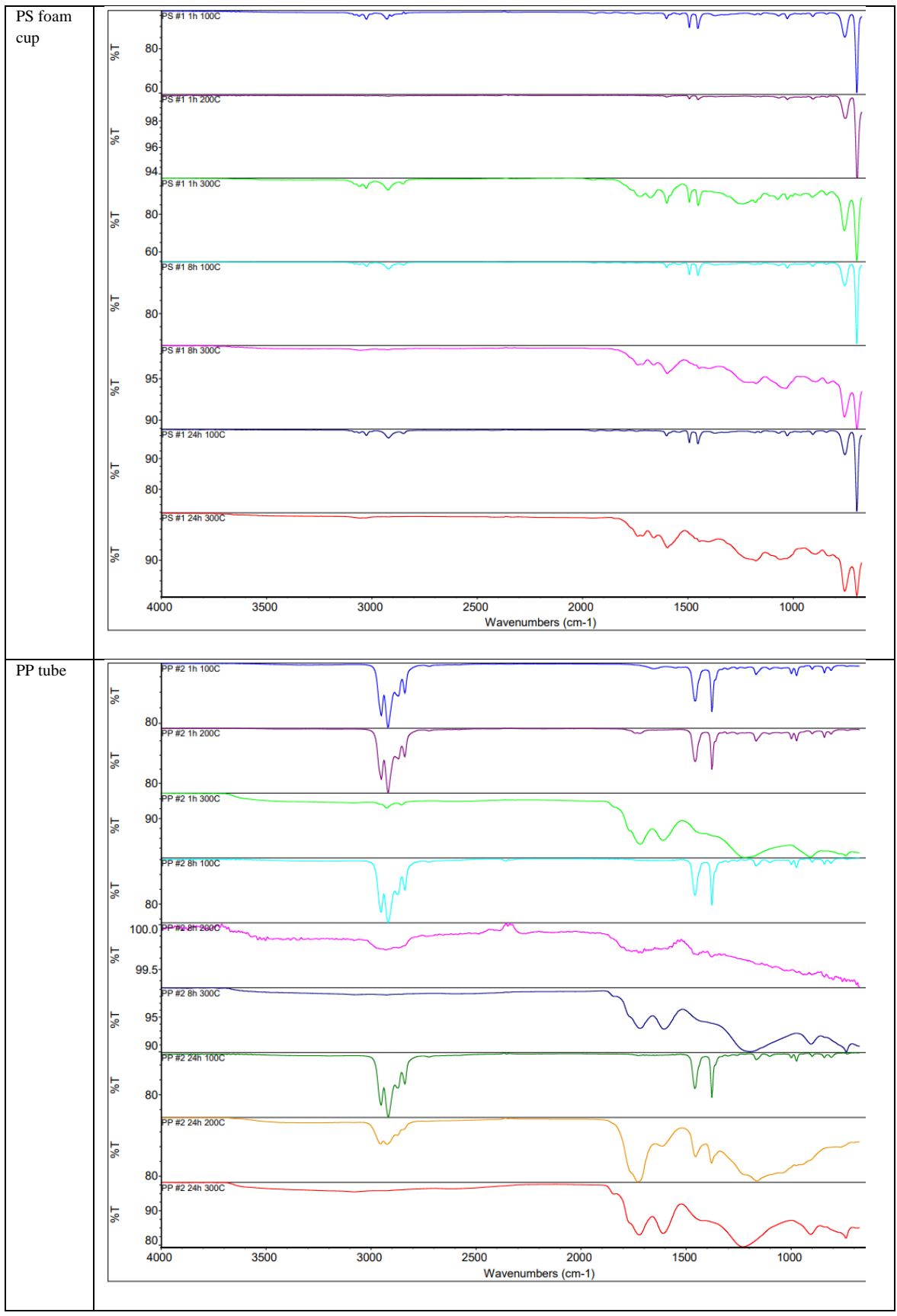
**Table S1.** Soil and Site Characteristics of Sampled Sites

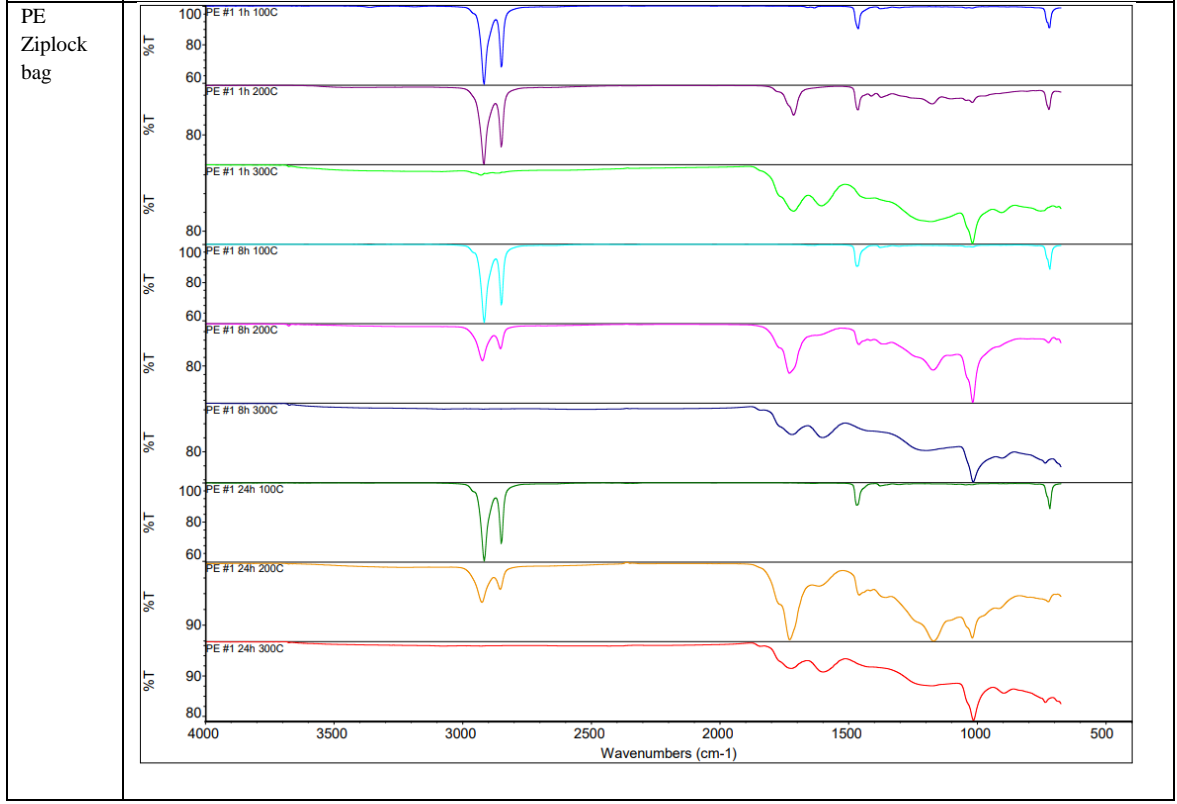
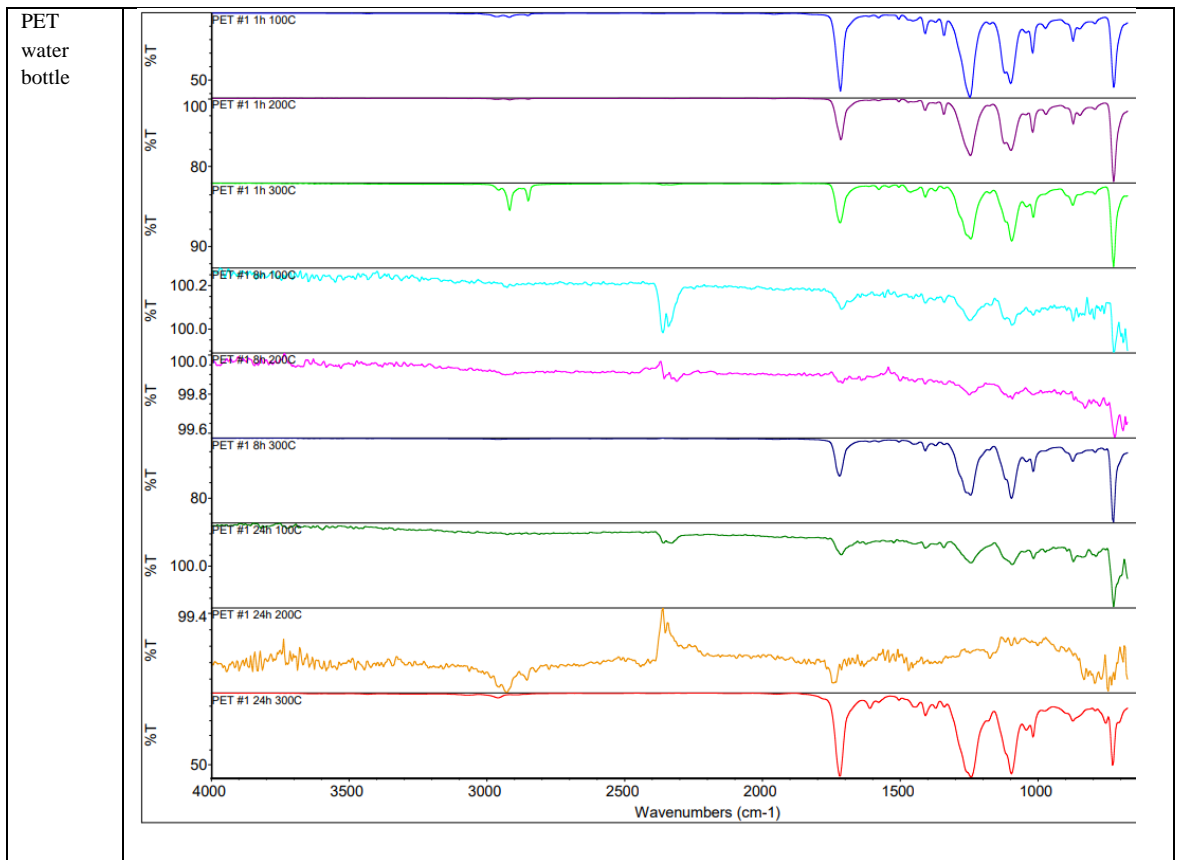
Site	MAT (°C)	MAP (mm)	Texture Class	Sand (%)	Silt (%)	Clay (%)	Organic Matter (%)	Soil Series	Soil Taxonomy	Area (m <sup>2</sup> )
Background - Lodge Grass & Crow	8	390	Loam	42.5	40.0	17.5	9.4	Lohmiller Haverson	Torrertic Ustifluvents Aridic Ustifluvents	-
Lodge Grass dump site - North	10	450	Sandy Loam	57.5	23.8	18.8	2.6	Farnuf	Typic Argiustolls	35,929
Lodge Grass dump site - Northwest			Sandy Clay Loam	47.5	27.5	25.0	3.2			
Lodge Grass dump site - West			Loam	50.0	28.8	21.3	2.3			
Lodge Grass dump site - Southwest			Loam	45.0	31.3	23.8	4.4			
Crow Agency burn site 1 - Northeast	8	390	Clay	27.5	1.3	71.3	2.5	Colby	Aridic Ustorthents	32,284
Crow Agency burn site 1 - Northwest			Clay Loam	37.5	22.5	40.0	2.4			
Crow Agency burn site 1 - Southwest			Sandy Clay Loam	47.5	26.3	26.3	4.7			
Crow Agency burn site 1 - Southeast			Clay	22.5	36.3	41.3	5.1			
Background - Single Family			Sandy Loam	55.0	32.5	12.5	4.7	Lucien Grainola	Udic Haplustolls Udertic Haplustalfs	-
Single Family dump site - North	15.3	932	Loam	45.0	36.3	18.8	7.9	Zaneis	Udic Argiustolls	207
Single Family dump site - West			Loam	50.0	31.3	18.8	8.6			
Single Family dump site - South			Sandy Loam	52.5	31.3	16.3	10.1			
Single Family dump site - East			Loam	50.0	33.8	16.3	7.3			

**Table S2: Thermally Oxidized Plastics Spectral Library**

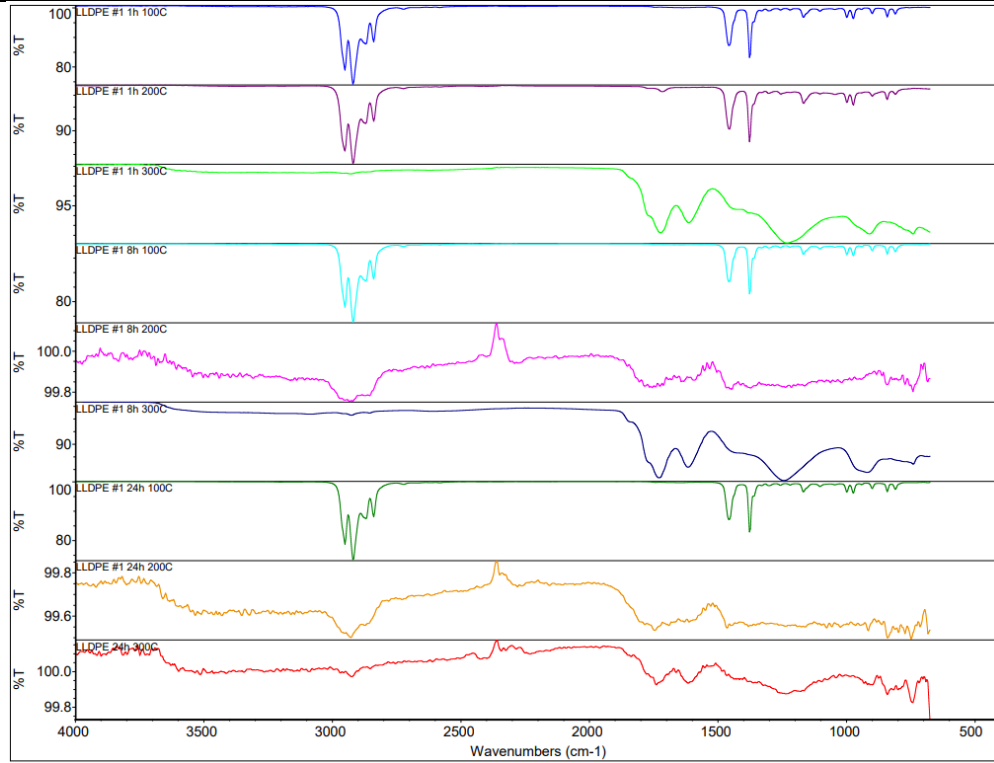


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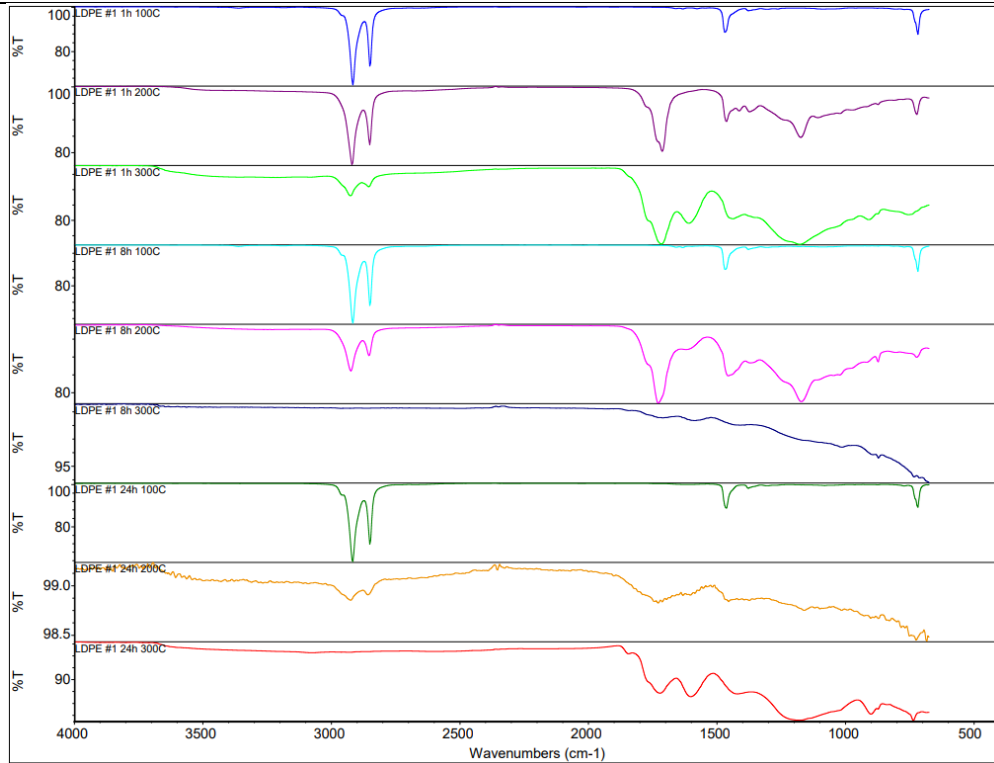




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plastic  
wrap

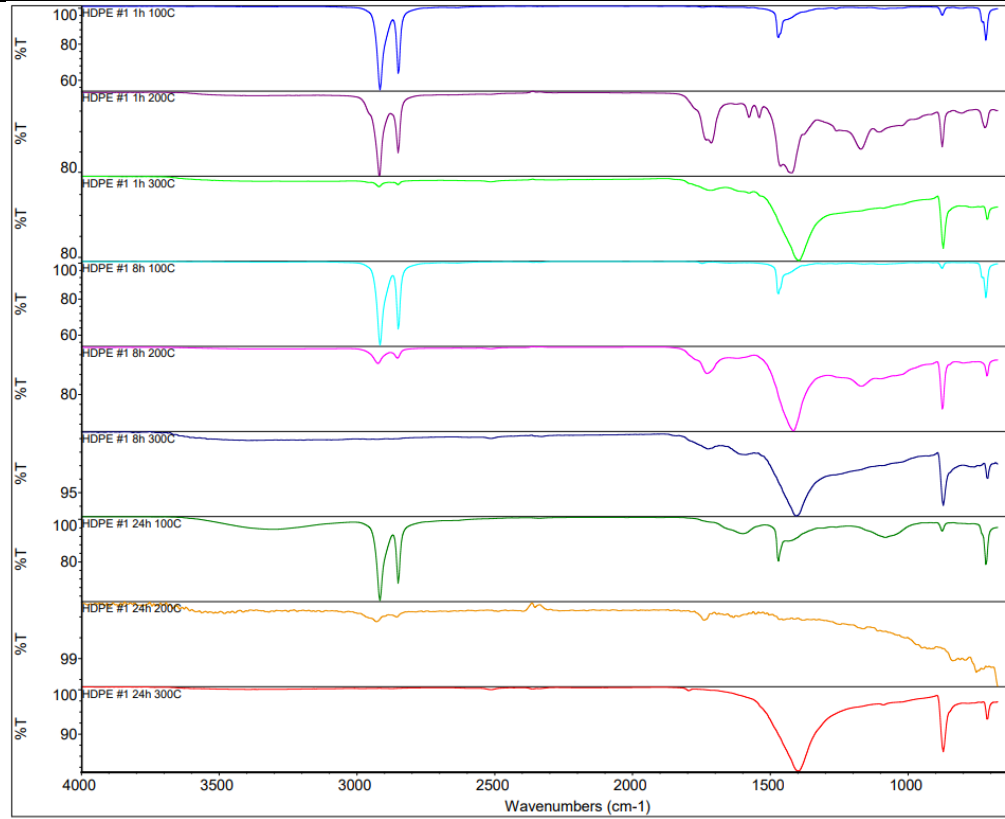


LDPE  
packaging  
bag

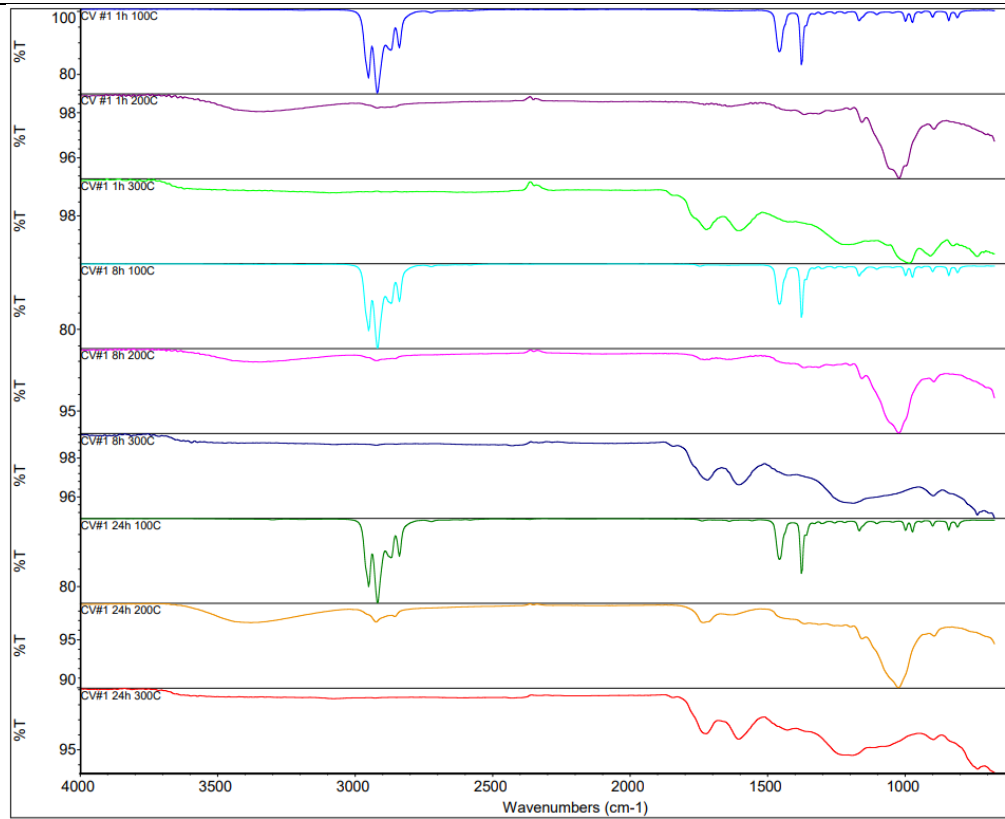




HDPE  
produce  
bag



CV  
pillow fill



**Table S3: Sampling Coordinates**

<b>Quadrant</b>	<b>Latitude</b>	<b>Longitude</b>
<b>Crow Agency</b>		
NW	45.6008580	-107.471354
	45.6007900	-107.471478
	45.6007660	-107.471488
NE	45.6001170	-107.470248
	45.6001330	-107.470272
	45.6001250	-107.470233
SW	45.6002470	-107.472257
	45.6001320	-107.472289
	45.6002176	-107.471832
SE	45.5994890	-107.470479
	45.5995260	-107.470434
	45.5994991	-107.470480
<b>Lodge Grass</b>		
<b>Quadrant</b>	<b>Latitude</b>	<b>Longitude</b>
N	45.3037820	-107.3710730
	45.3037537	-107.3709180
	45.3037537	-107.3709188
NW	45.3035300	-107.3718140
	45.3035011	-107.3716261
	45.3035011	-107.3716261
W	45.3032930	-107.3724870
	45.3033439	-107.3722682
	45.3033439	-107.3722682
SW	45.3032793	-107.3716297
	45.3031369	-107.3716116
	45.3031369	-107.3716116
<b>Tuttle Oklahoma</b>		
Not provided for privacy protection		
<b>Background Site Crow/Lodge Grass</b>		
	45.585739	-107.437576
	45.5856908	-107.4375479
	45.5856908	-107.4375479

**Table S4: Particle Quantification**

Lodge Grass Dump Site Quantification					
Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)	Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)
<i>0-9 cm</i>			<i>9-18 cm</i>		
N-1*	149	14,900	N-1	367	36,700
N-2	79	7,900	N-2*	692	69,200
N-3	23	2,300	N-3	376	37,600
NW-1	140	14,000	NW-1	50	5,000
NW-2*	350	35,000	NW-2*	216	21,600
NW-3	75	7,500	NW-3	104	10,400
W-1*	287	28,700	W-1	132	13,200
W-2	162	16,200	W-2	113	11,300
W-3	134	13,400	W-3*	188	18,800
SW-1	161	16,100	SW-1	173	17,300
SW-2*	318	31,800	SW-2*	270	27,000
SW-3	272	27,200	SW-3	199	19,900

Crow Agency Burn Site Quantification					
Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)	Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)
<i>0-9 cm</i>			<i>9-18 cm</i>		
NW-1	174	17,400	NW-1*	215	21,500
NW-2	60	6,000	NW-2	131	13,100
NW-3*	236	23,600	NW-3	207	20,700
NE-1	93	9,300	NE-1	44	4,400
NE-2*	151	15,100	NE-2*	136	13,600
NE-3	54	5,400	NE-3	131	13,100
SW-1	74	7,400	SW-1*	165	16,500
SW-2	176	17,600	SW-2	68	6,800
SW-3*	178	17,800	SW-3	91	9,100
SE-1*	216	21,600	SE-1	224	22,400
SE-2	144	14,400	SE-2*	329	32,900
SE-3	212	21,200	SE-3	320	32,000

Tuttle Oklahoma Site Quantification					
Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)	Quadrant-Replicate #	Particle Count	Concentration (particles kg <sup>-1</sup> soil)
<i>0-9 cm</i>			<i>9-18 cm</i>		
West-1	9	900	West-1*	72	7,200
West-2	12	1,200	West-2	12	1,200
West-3*	15	1,500	West-3	23	2,300
South-1	17	1,700	South-1	23	2,300
South-2*	19	1,900	South-2*	195	19,500
South-3	11	1,100	South-3	68	6,800


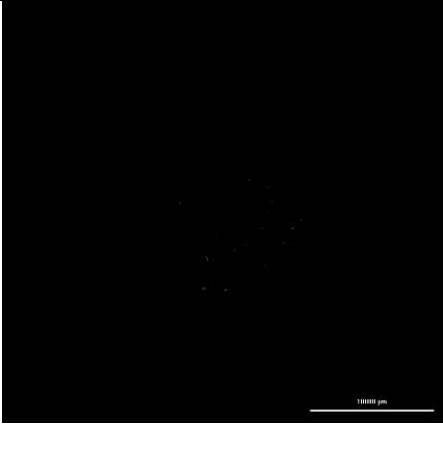
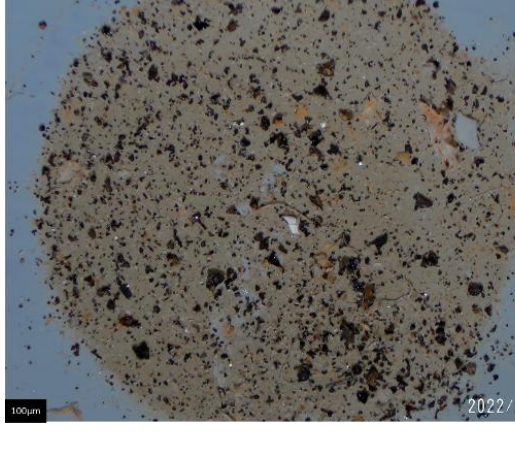
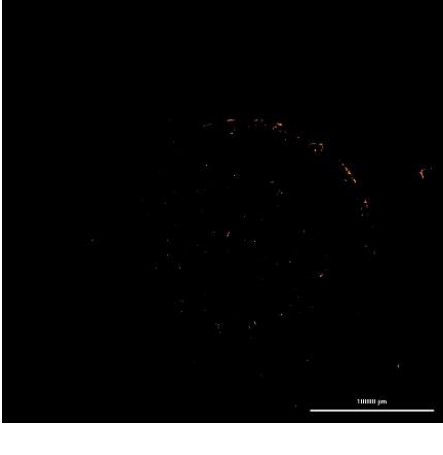
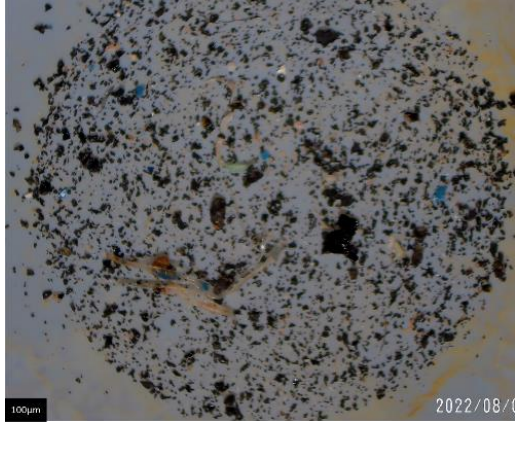
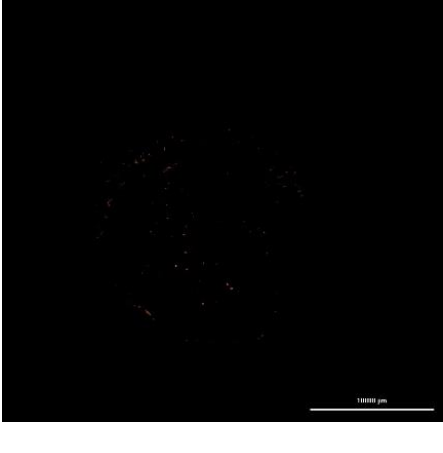
East-1	n/a	n/a	East-1	15	1,500
East-2	27	2,700	East-2	17	1,700
East-3*	30	3,000	East-3*	18	1,800
North-1	19	1,900	North-1	19	1,900
North-2	31	3,100	North-2	31	3,100
North-3*	123	12,300	North-3*	21	2,100

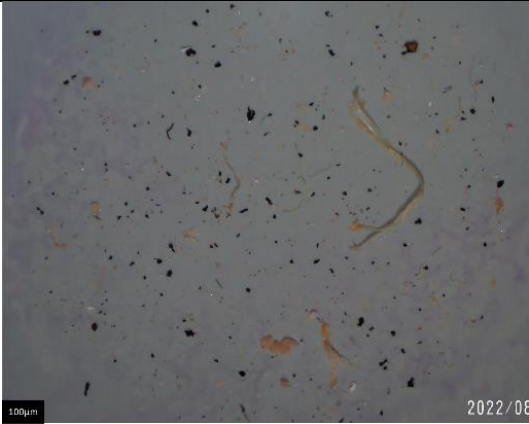
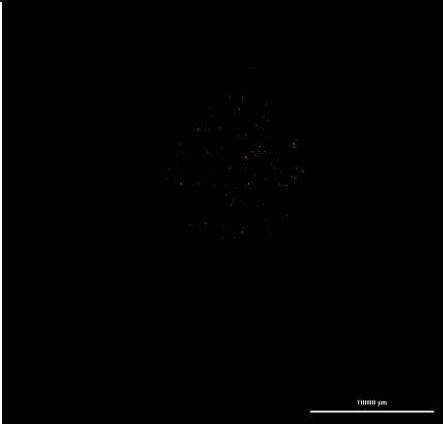

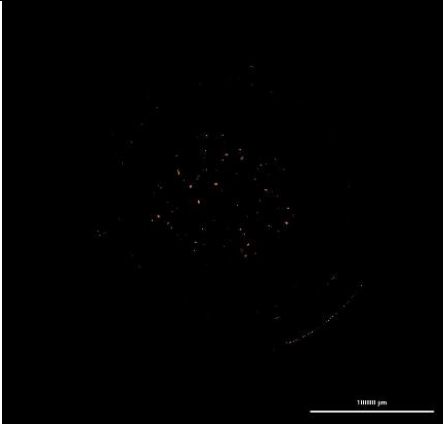
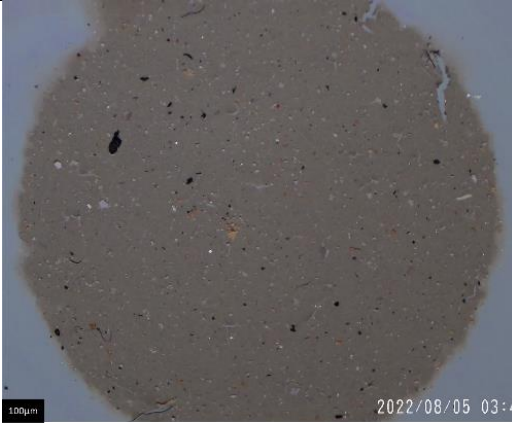
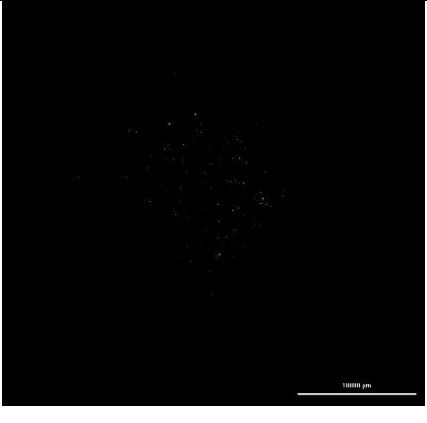
\*Selected as representative sample for ATR-FTIR analysis

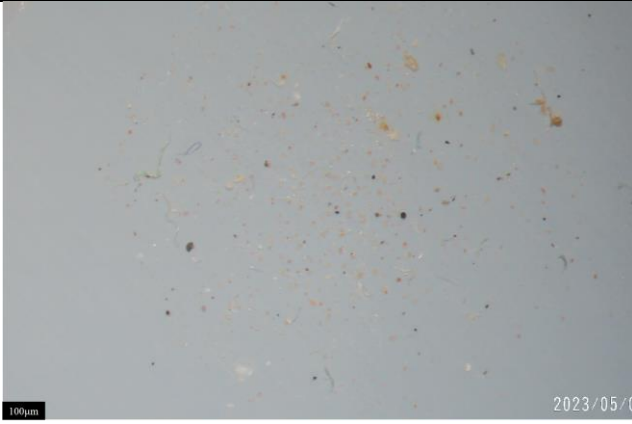
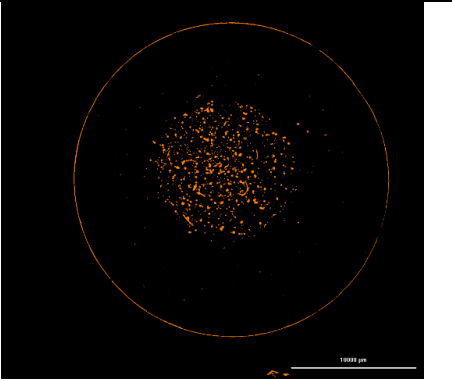

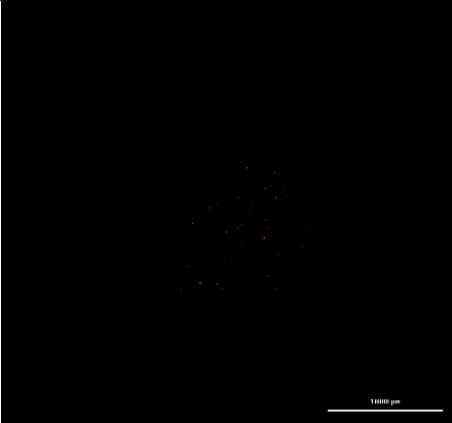
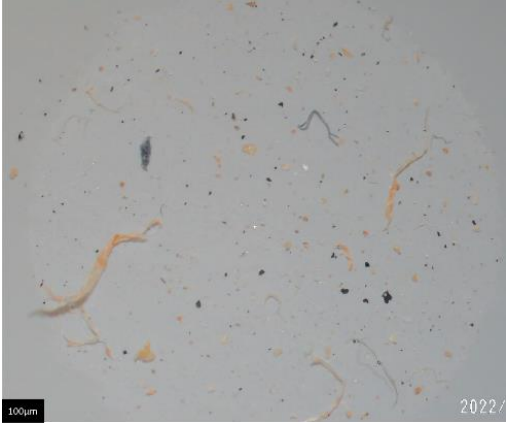
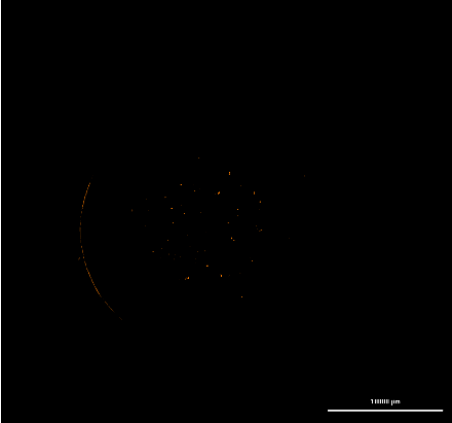
**Table S5:** Lab Controls and Background Sites Quantification

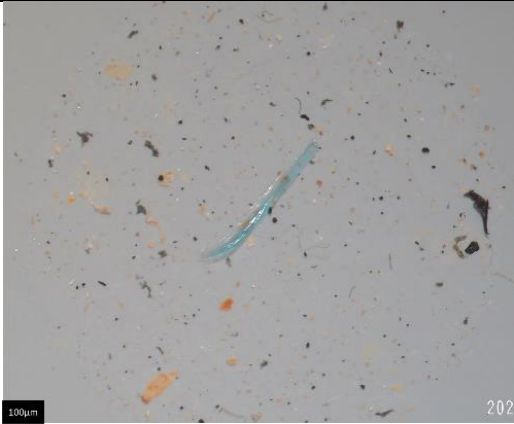
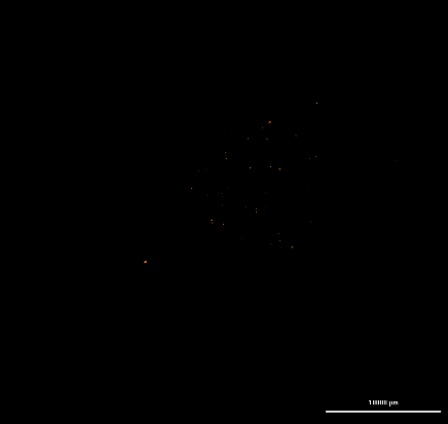

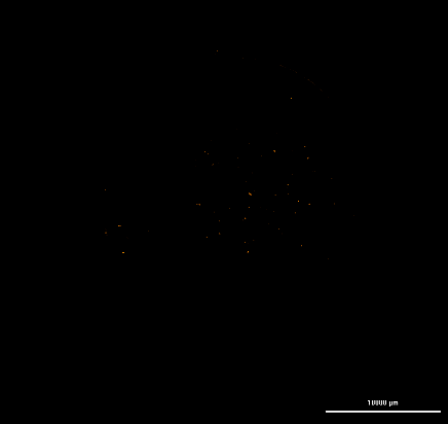
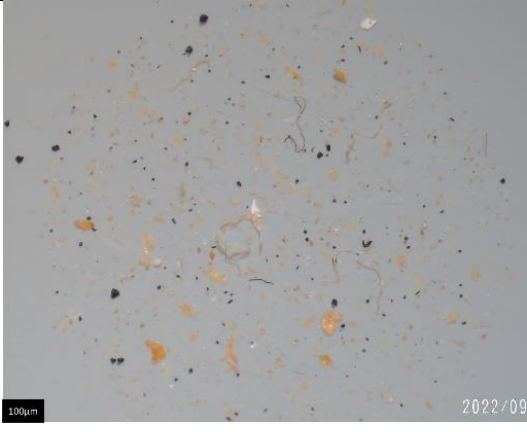
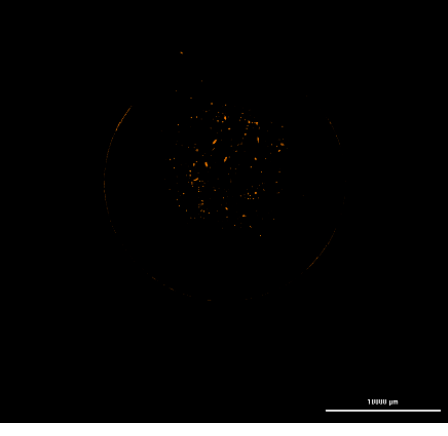
Sample Name-Replicate	Particle Count	Concentration (particles kg <sup>-1</sup> soil)	Sample Name-Replicate	Particle Count	Concentration (particles kg <sup>-1</sup> soil)
<i>0-9 cm</i>			<i>9-18 cm</i>		
Tuttle OK Background-Run 1	29	2,900	Tuttle OK Background Run 1	34	3,400
Tuttle OK Background- Run 2	15	1,500	Tuttle OK Background Run 2	18	1,800
Tuttle OK Background- Run 3	32	3,200	Tuttle OK Background Run 3	40	4,000
CABS & LG Background- Run 1	54	5,400	CABS & LG Background Run 1	25	2,500
CABS & LG Background- Run 2	6	600	CABS & LG Background Run 2	23	2,300
CABS & LG Background- Run 3	12	1,200	CABS & LG Background Run 3	43	4,300
<b>LAB CONTROLS</b>					
Lab Control 1	21	n/a			
Lab Control 2	46	n/a			
Lab Control 3	23	n/a			

**Table S6.** Tuttle Oklahoma Burn Site Stereomicroscopy & Fluorescence Microscopy

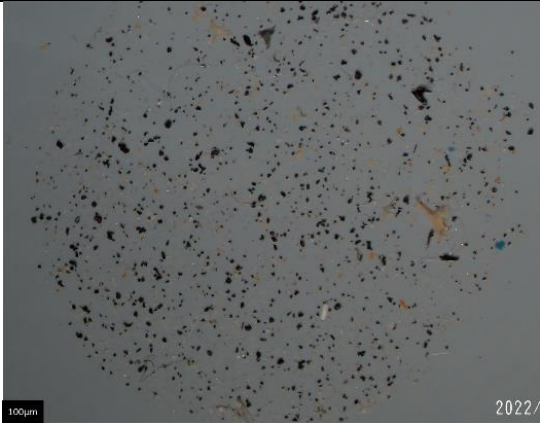
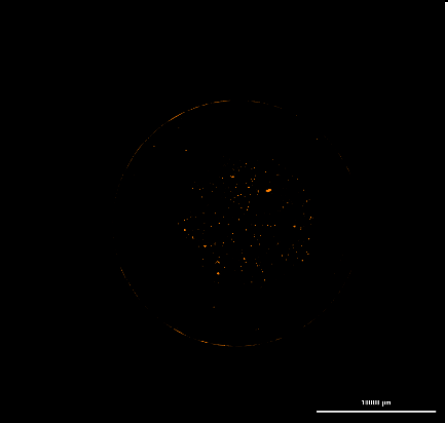
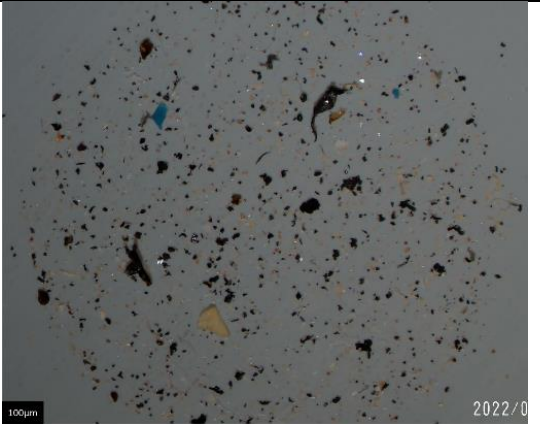



0-9cm West 1		
0-9cm West 2		
0-9cm West 3		

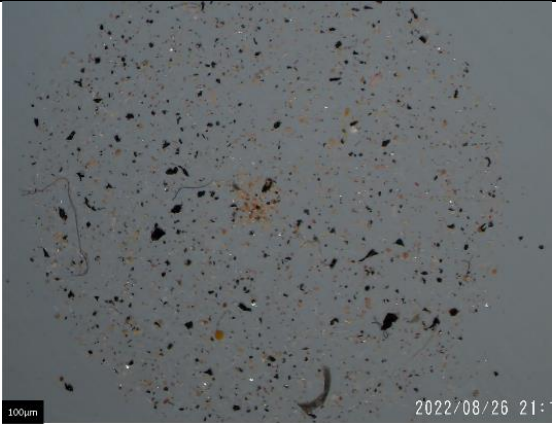
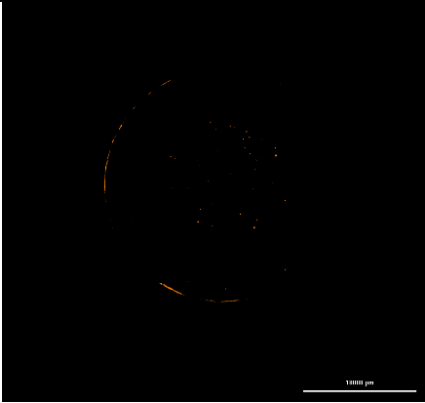

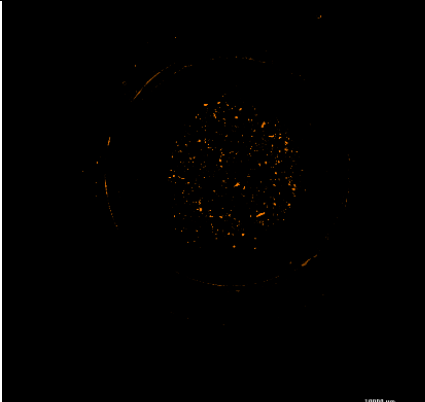
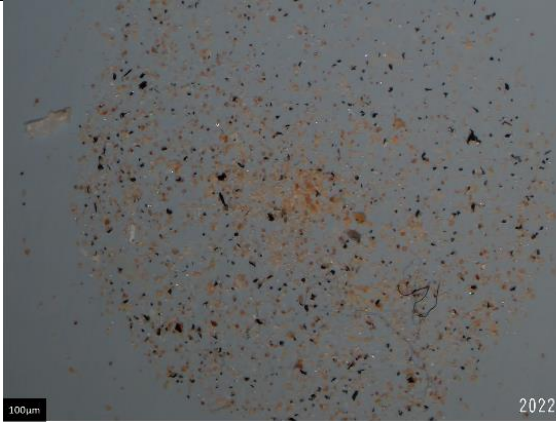

<p>0-9cm South 1</p>		
<p>0-9cm South 2</p>		
<p>0-9cm South 3</p>		

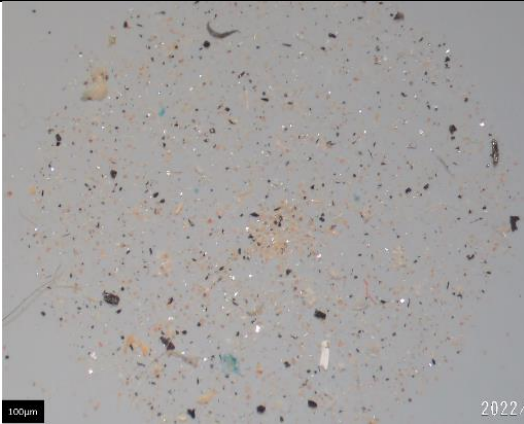
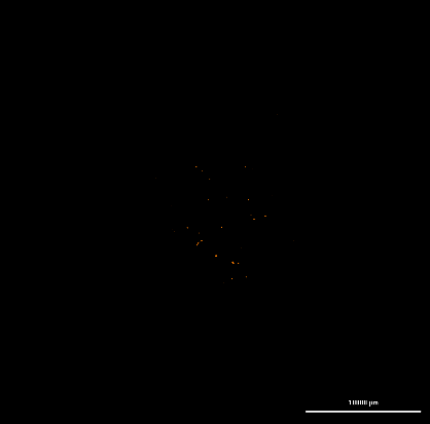

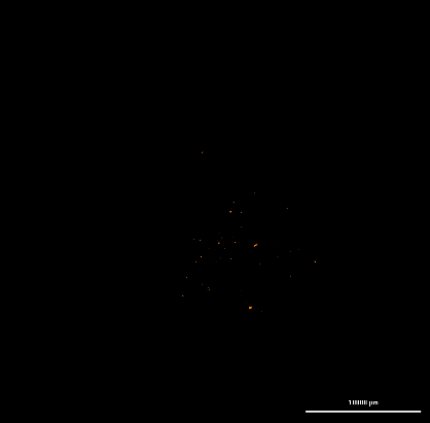
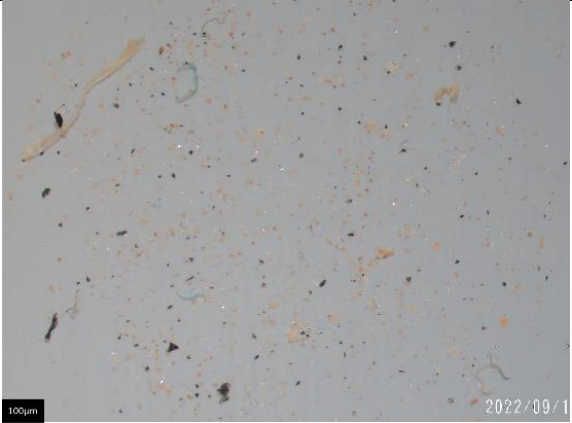
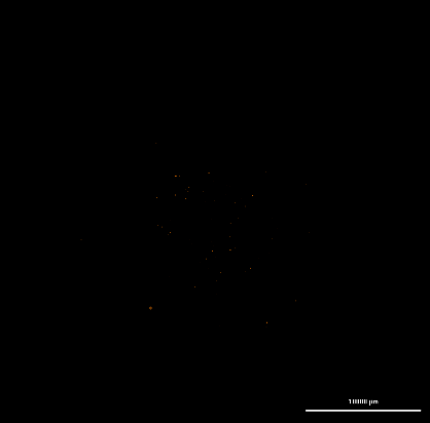
<p>0-9cm East 1</p>		
<p>0-9cm East 2</p>		
<p>0-9cm East 3</p>		

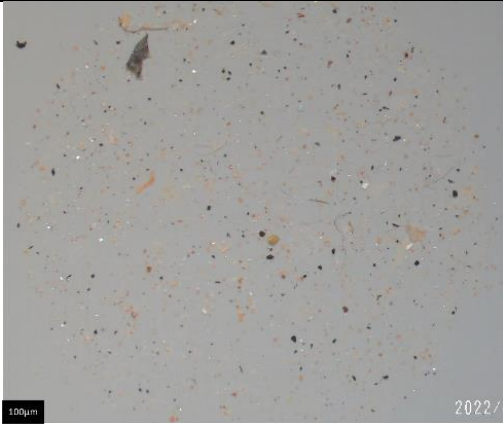
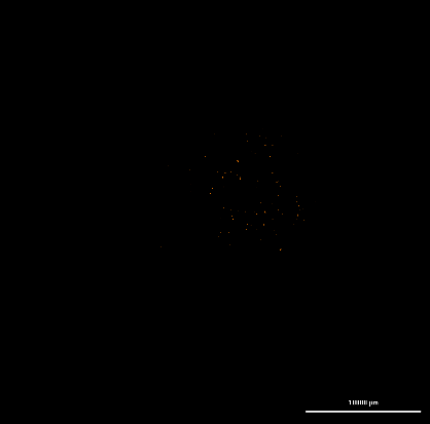
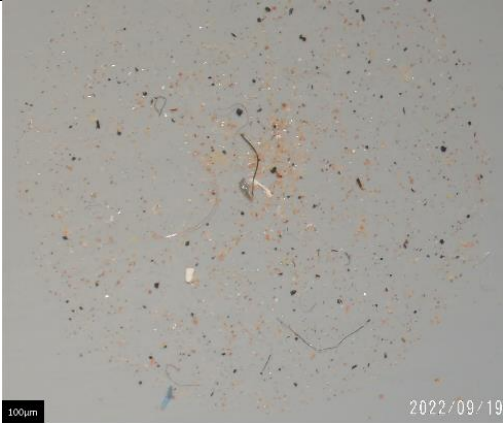
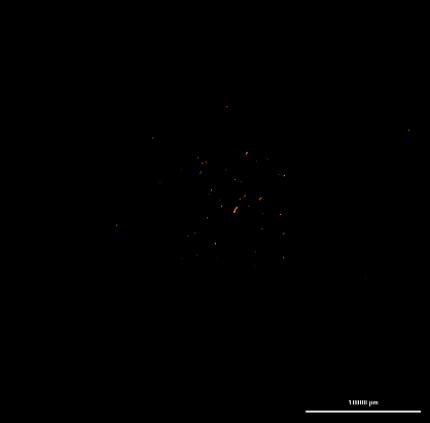
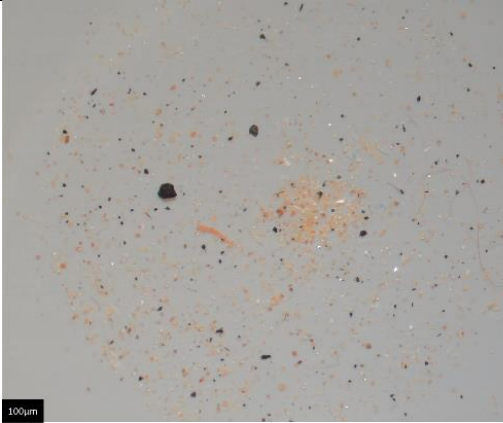
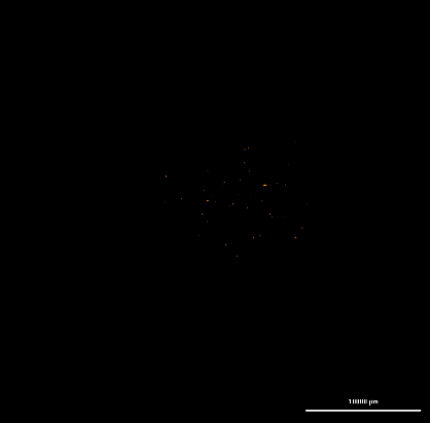
<p>0-9cm North 1</p>		
<p>0-9cm North 2</p>		
<p>0-9cm North 3</p>		




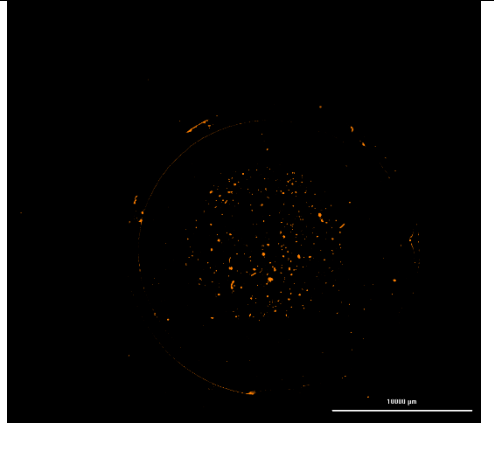
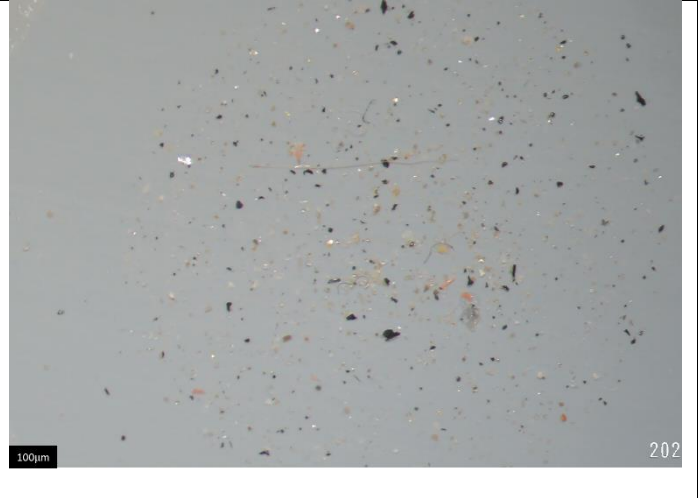
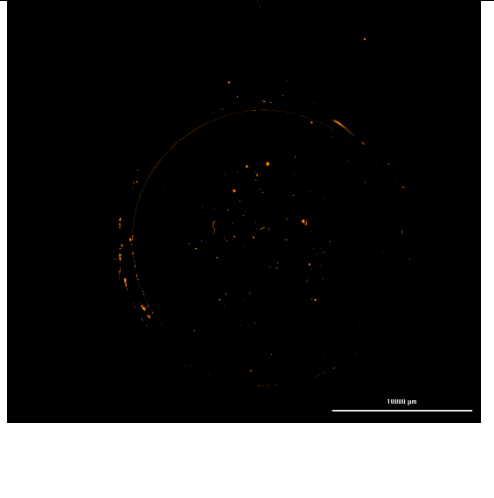

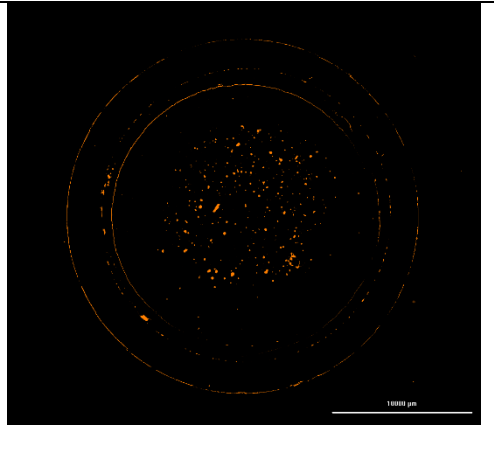
<p>9-18cm West 1</p>		
<p>9-18cm West 2</p>		
<p>9-18cm West 3</p>		

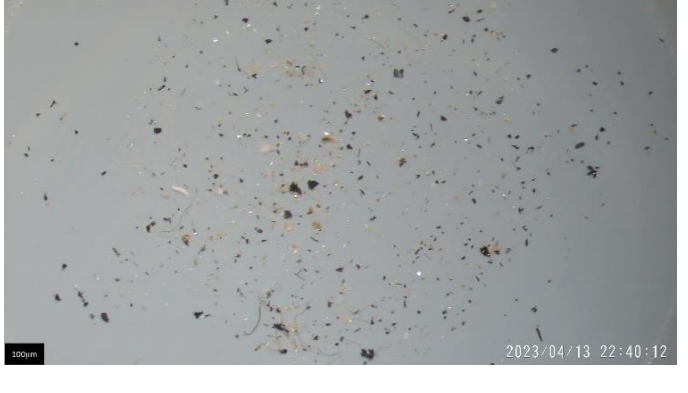
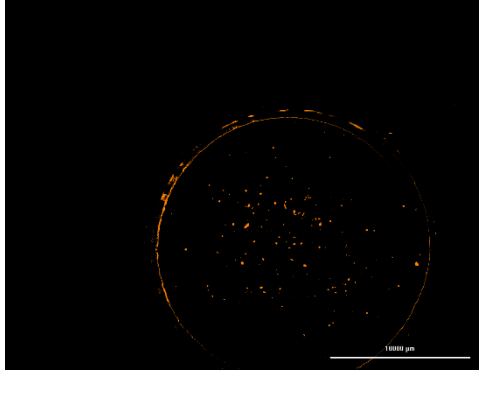
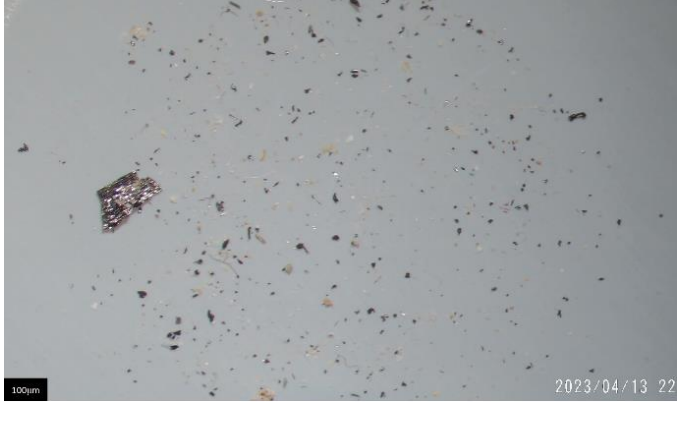
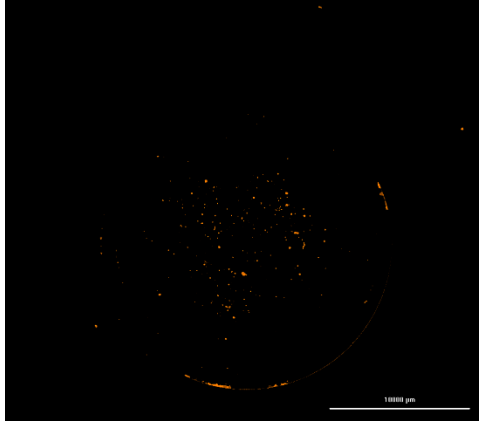

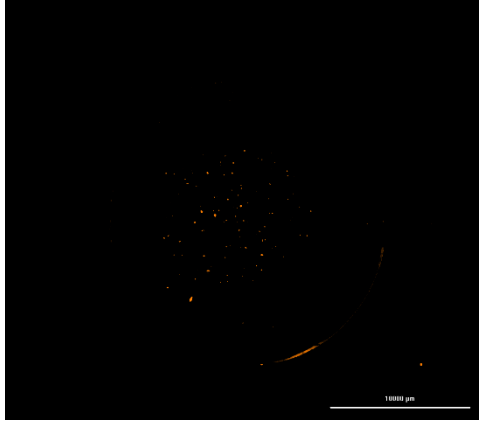
<p>9-18cm South 1</p>		
<p>9-18cm South 2</p>		
<p>9-18cm South 3</p>		

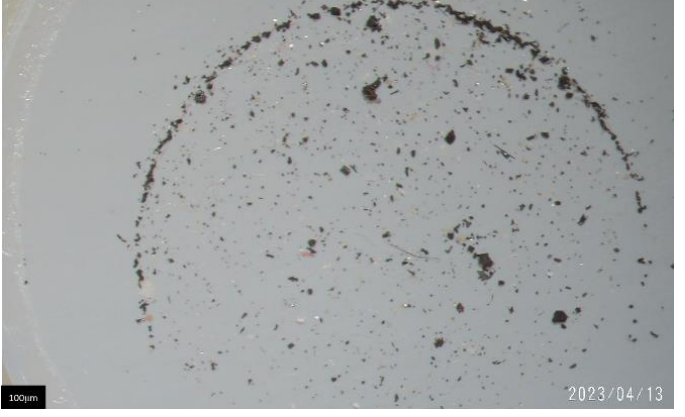
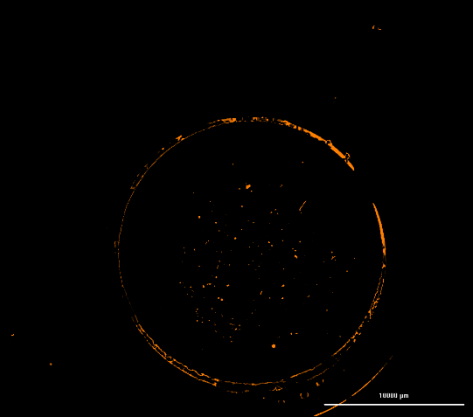
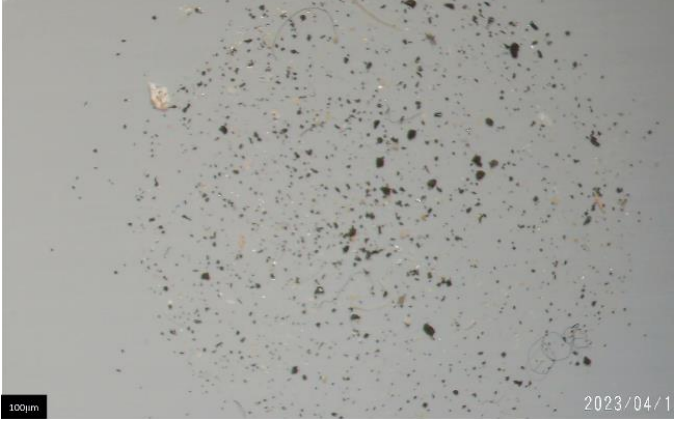
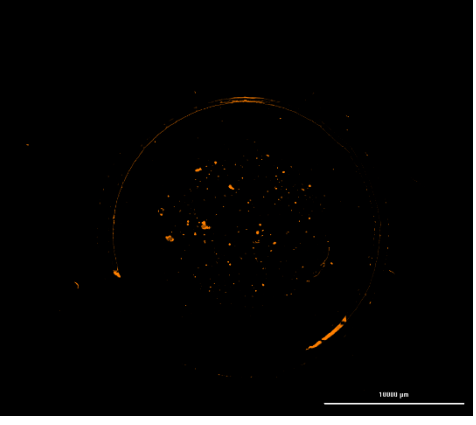
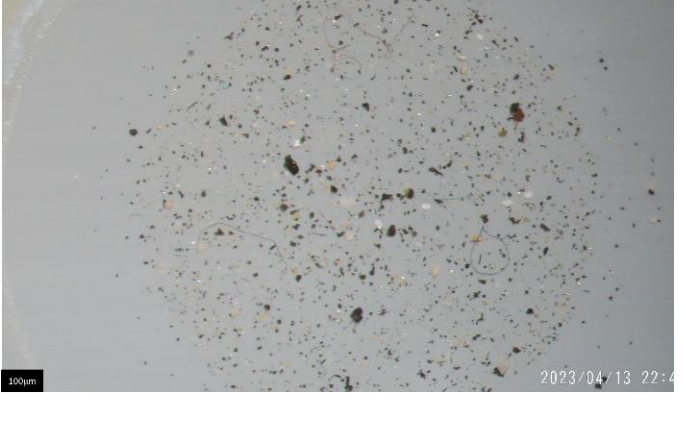
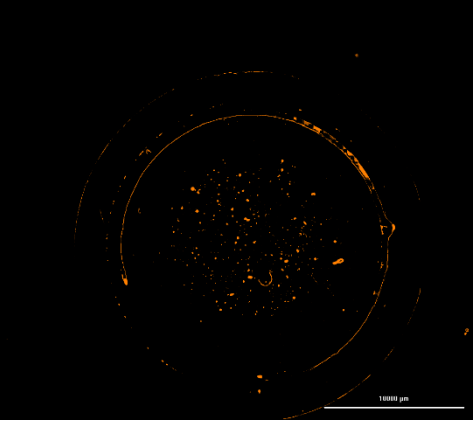
<p>9-18cm East 1</p>		
<p>9-18cm East 2</p>		
<p>9-18cm East 3</p>		


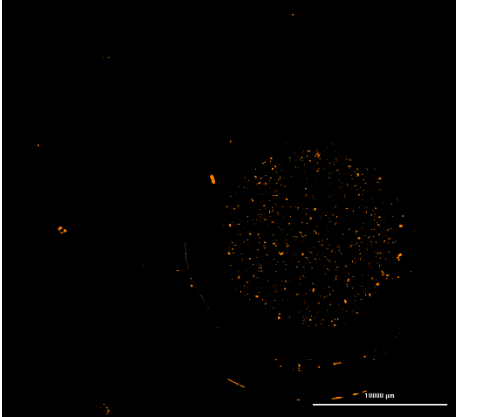

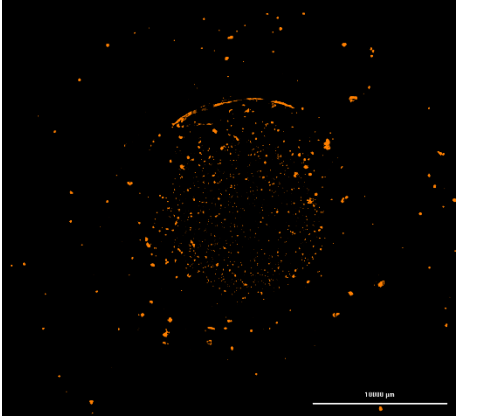

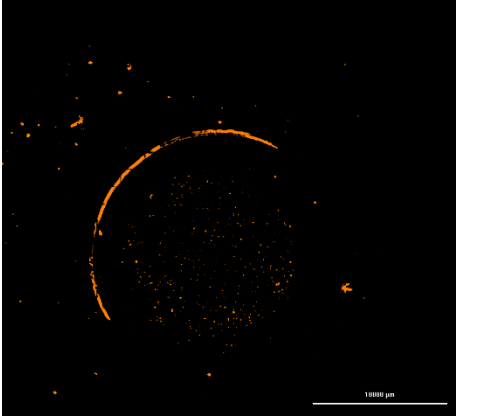
<p>9-18cm North 1</p>		
<p>9-18cm North 2</p>		
<p>9-18cm North 3</p>		

**Table S7.** Crow Agency Burn Site Stereomicroscopy & Fluorescence Microscopy

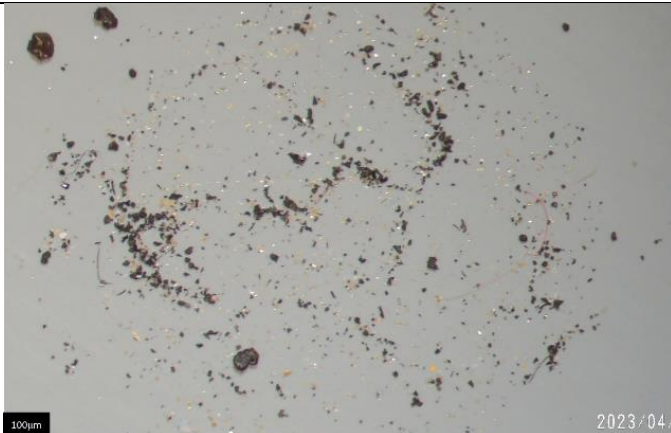
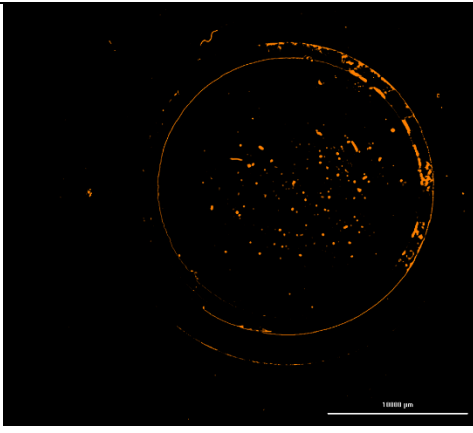
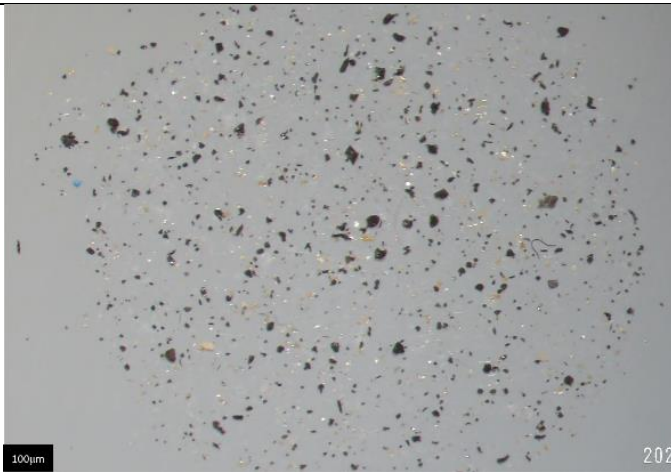
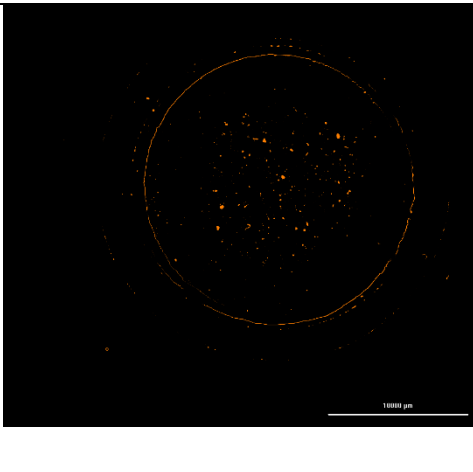
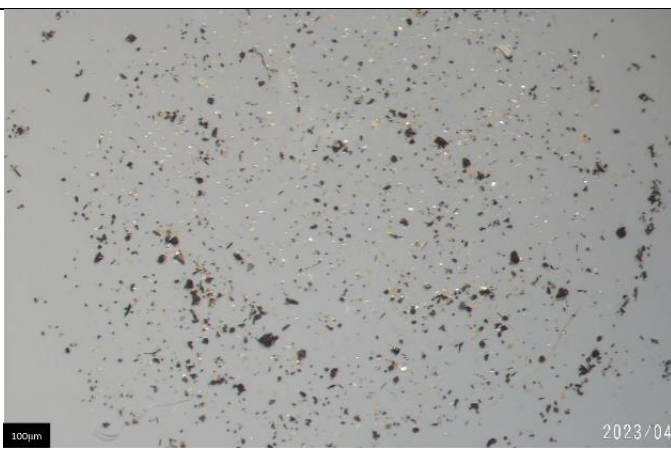
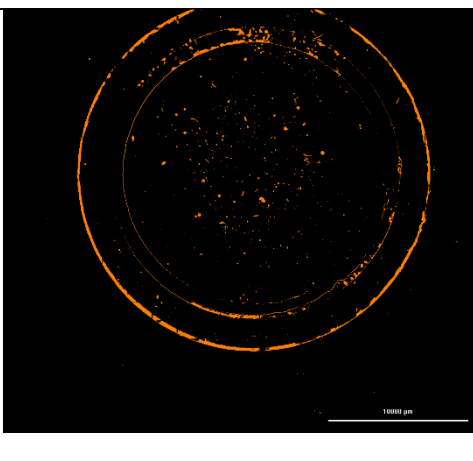
0-9cm NW 1		
0-9cm NW 2		
0-9cm NW 3		


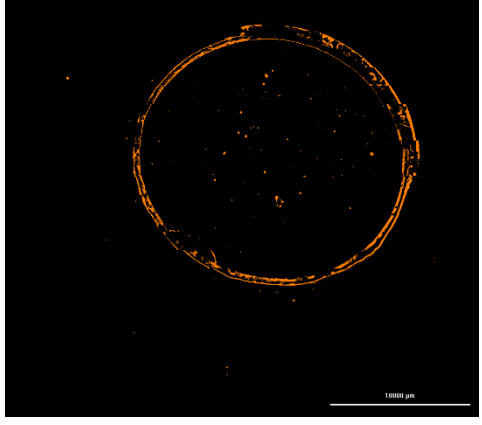
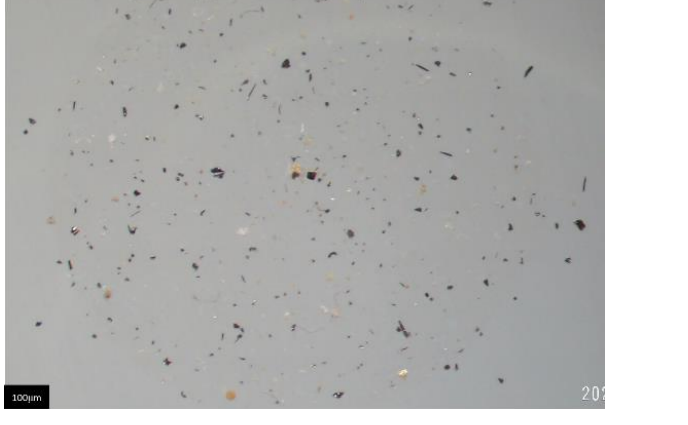
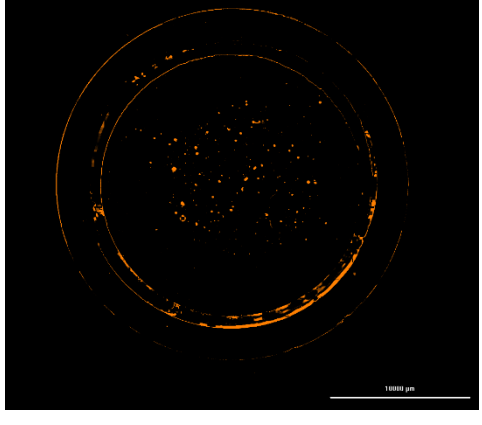

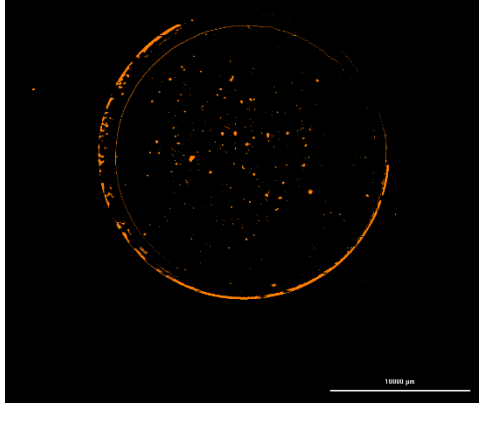
<p>0-9cm NE 1</p>		
<p>0-9cm NE 2</p>		
<p>0-9cm NE 3</p>		

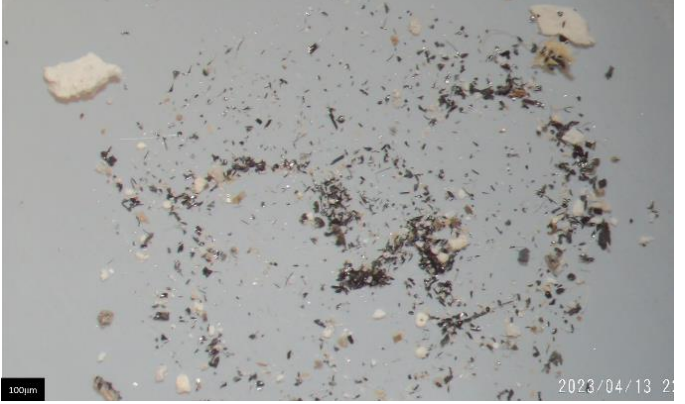
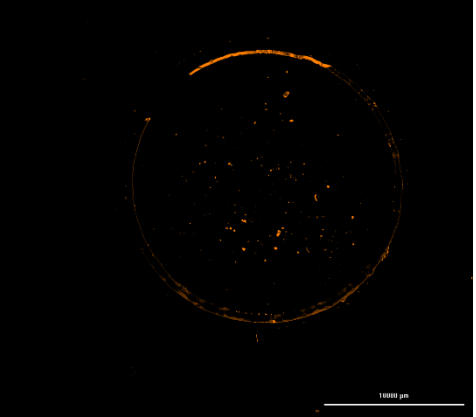
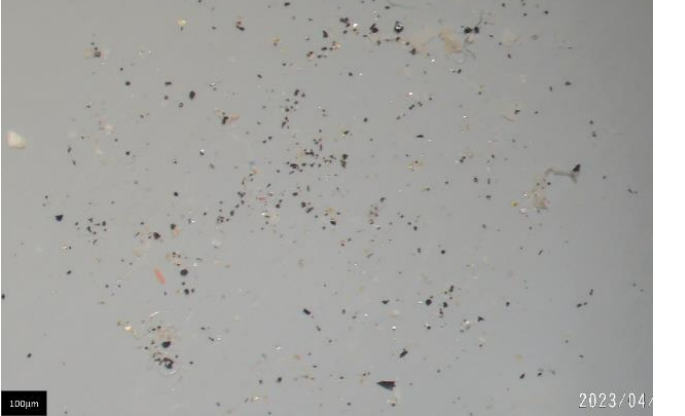
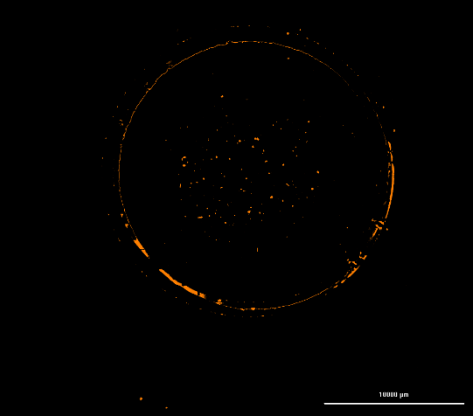
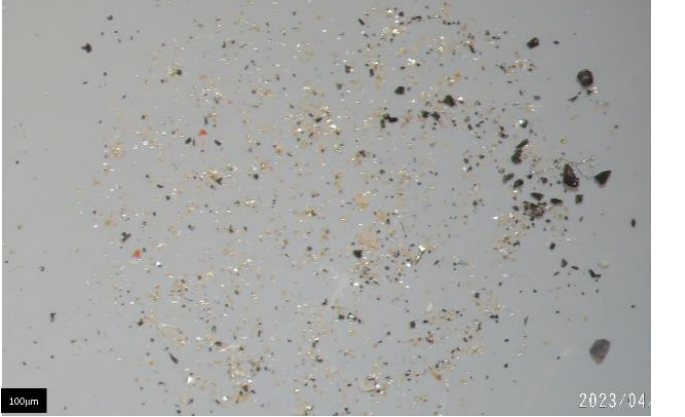
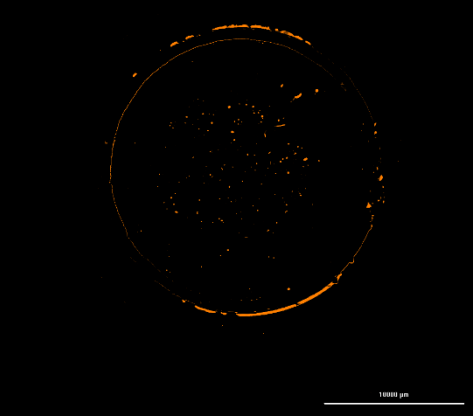
<p>0-9cm SW 1</p>		
<p>0-9cm SW 2</p>		
<p>0-9cm SW 3</p>		


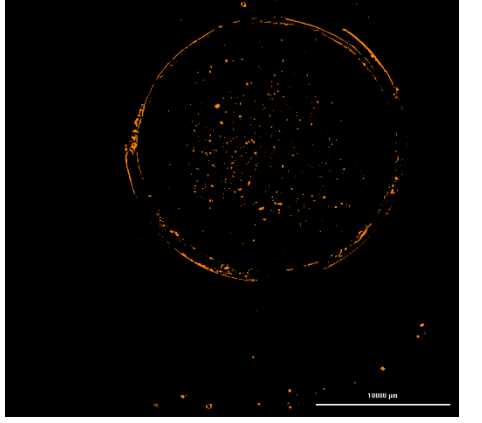

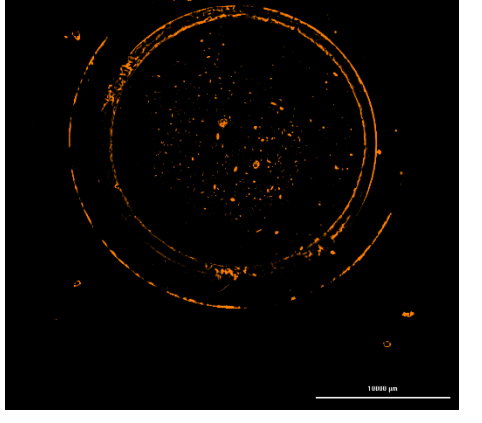

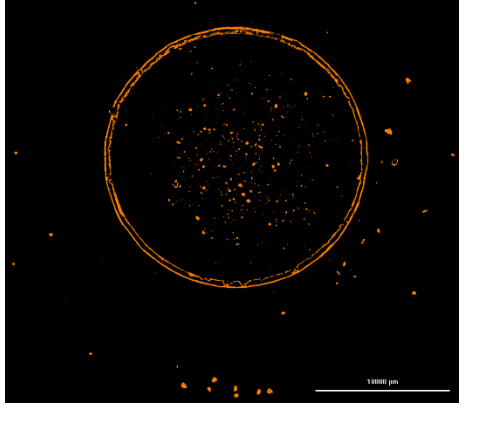
<p>0-9cm SE 1</p>		
<p>0-9cm SE 2</p>		
<p>0-9cm SE 3</p>		



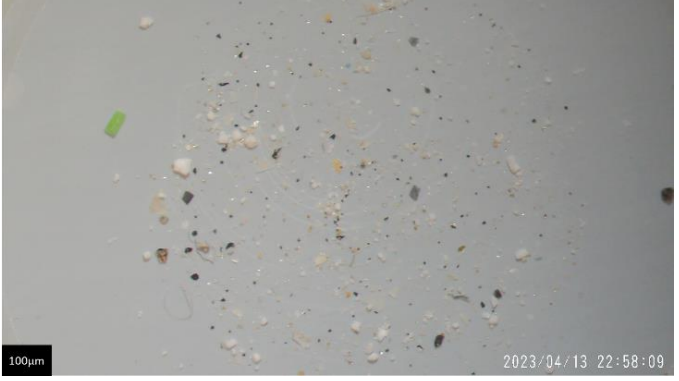
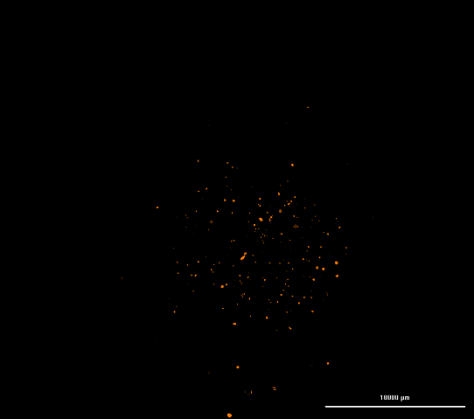

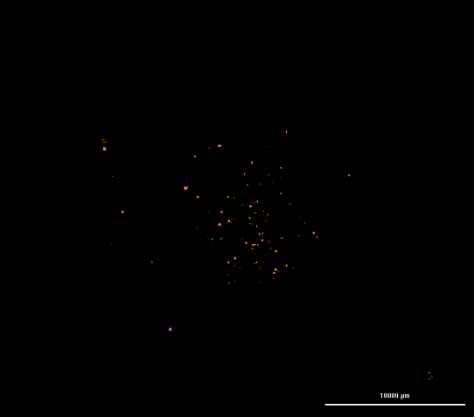

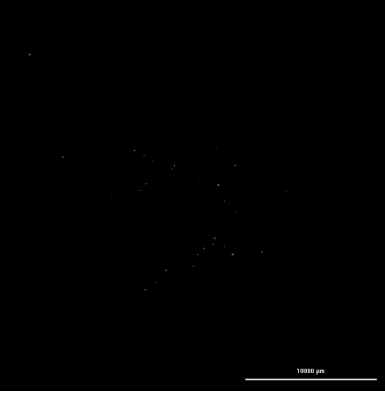
<p>9-18cm NW 1</p>		
<p>9-18cm NW 2</p>		
<p>9-18cm NW 3</p>		

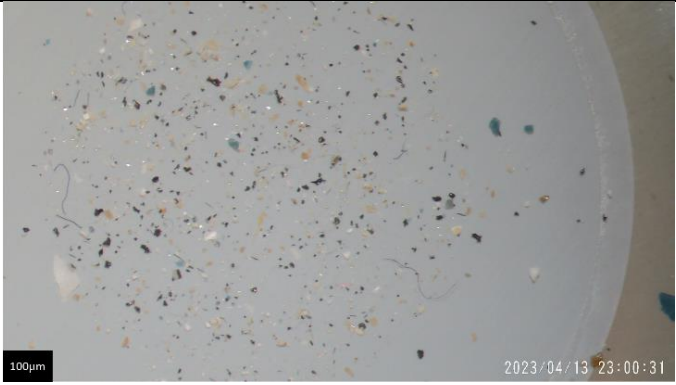
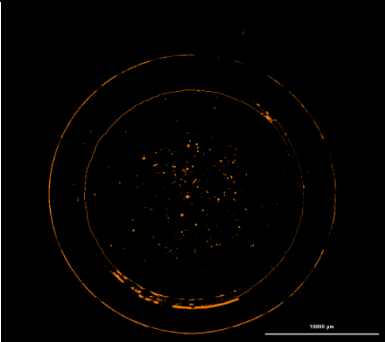
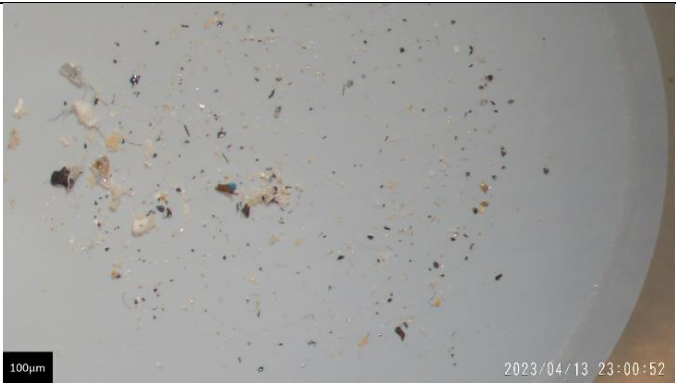
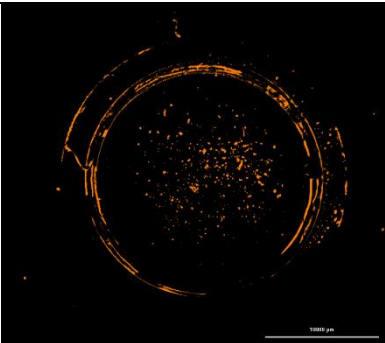
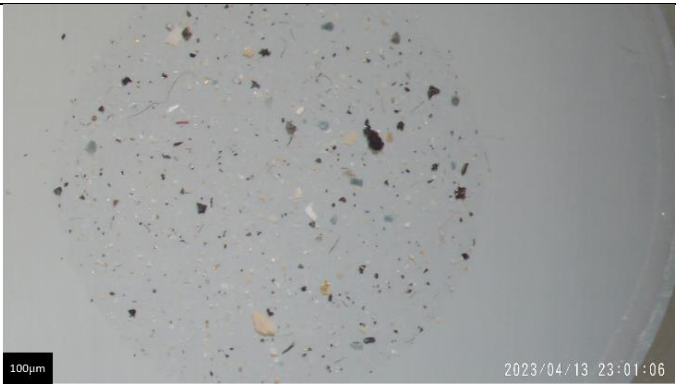
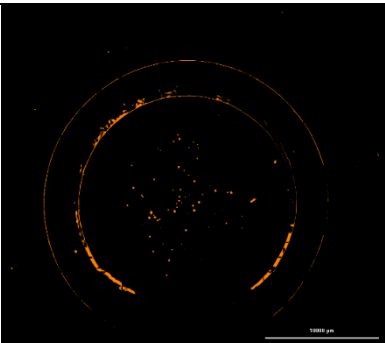
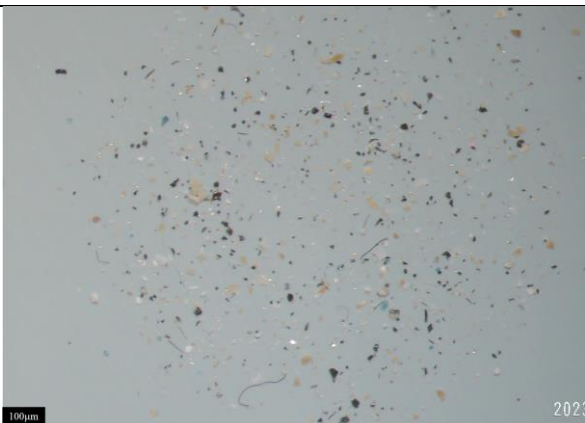
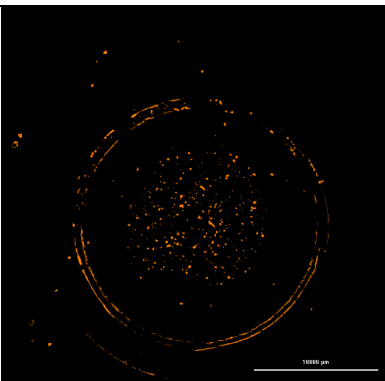
<p>9-18cm NE 1</p>		
<p>9-18cm NE 2</p>		
<p>9-18cm NE 3</p>		


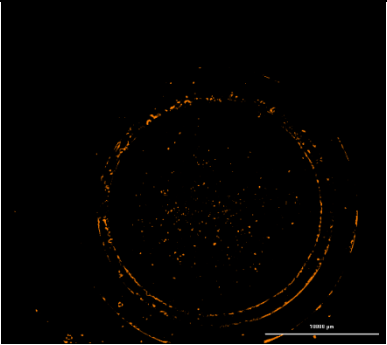
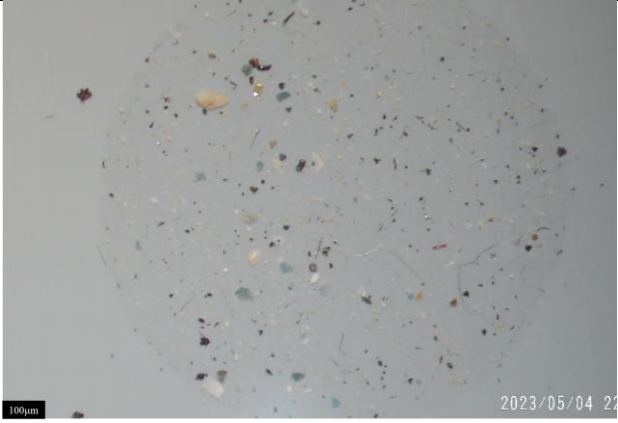
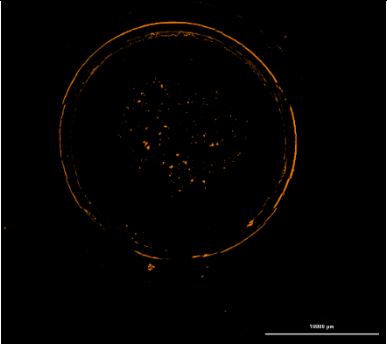
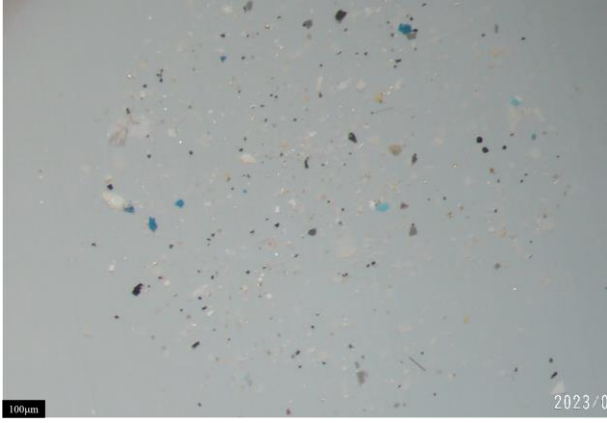
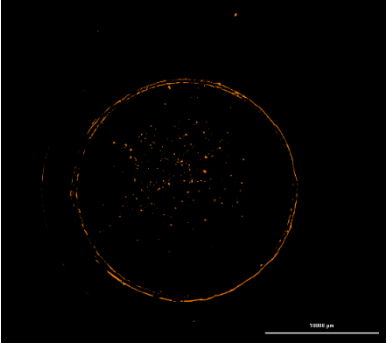
<p>9-18cm SW 1</p>		
<p>9-18cm SW 2</p>		
<p>9-18cm SW 3</p>		

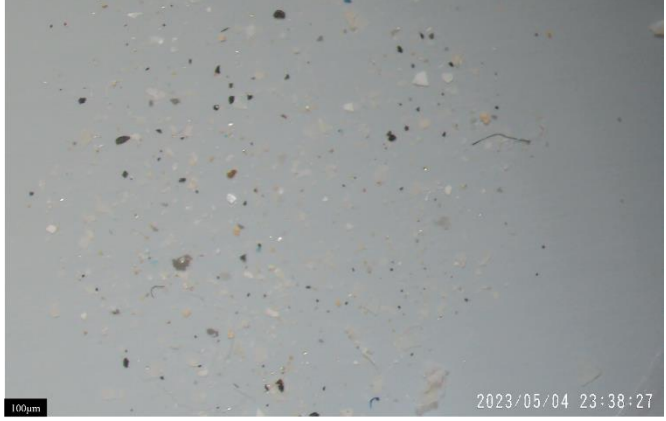
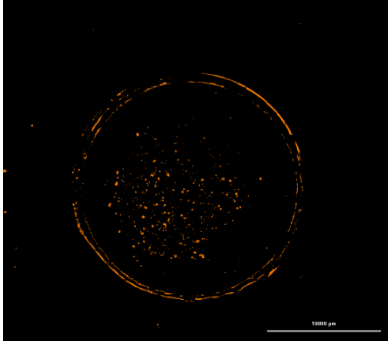

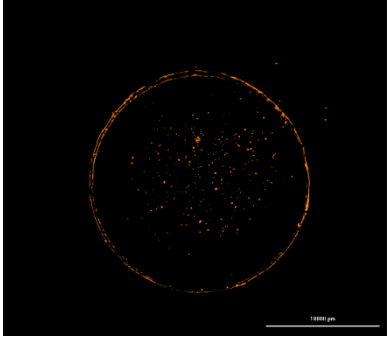
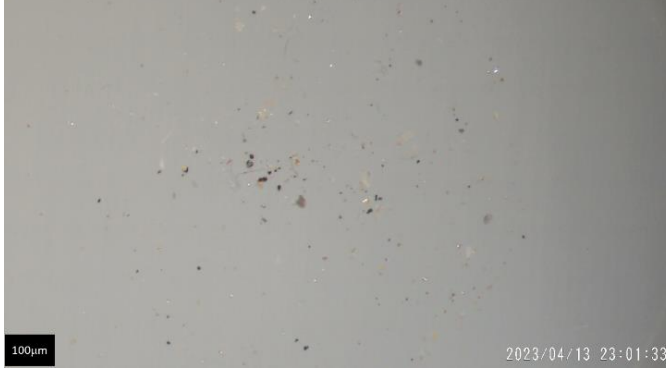
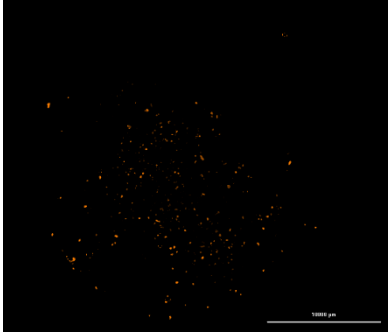
<p>9-18cm SE 1</p>		
<p>9-18cm SE 2</p>		
<p>9-18cm SE 3</p>		

**Table S8.** Lodge Grass Dump Site Stereomicroscopy & Fluorescence Microscopy


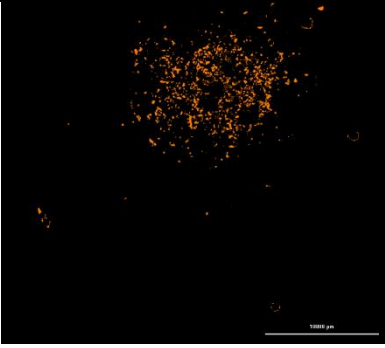
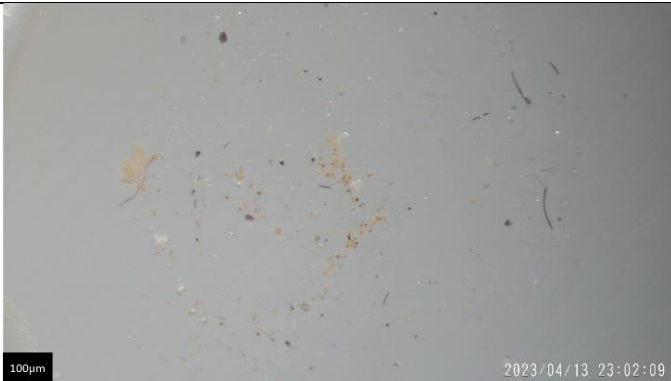
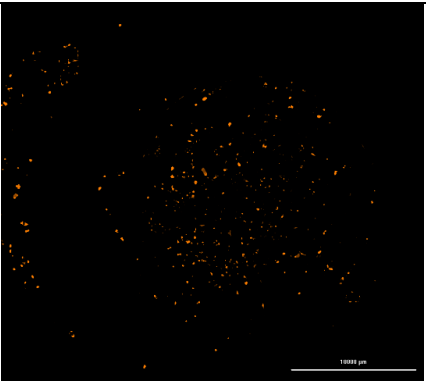

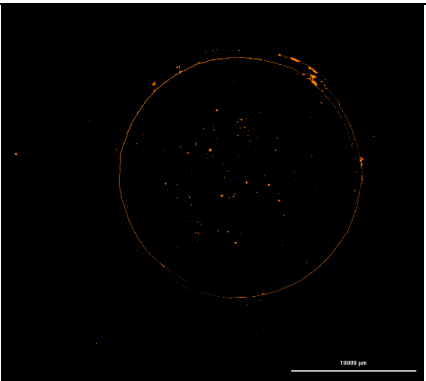

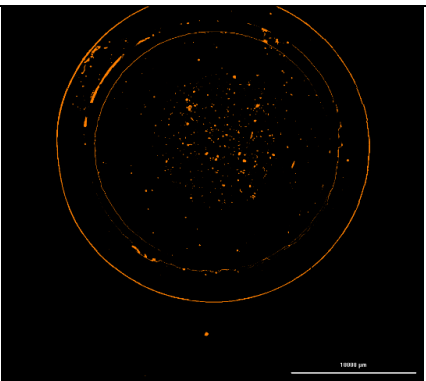
0-9cm North 1		
0-9cm North 2		
0-9cm North 3		


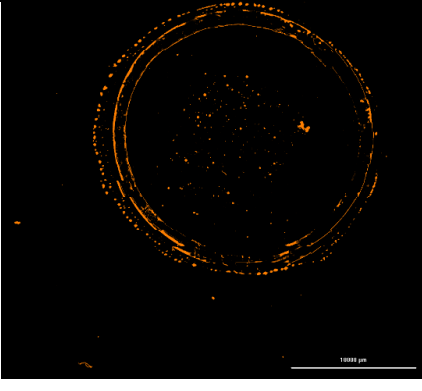
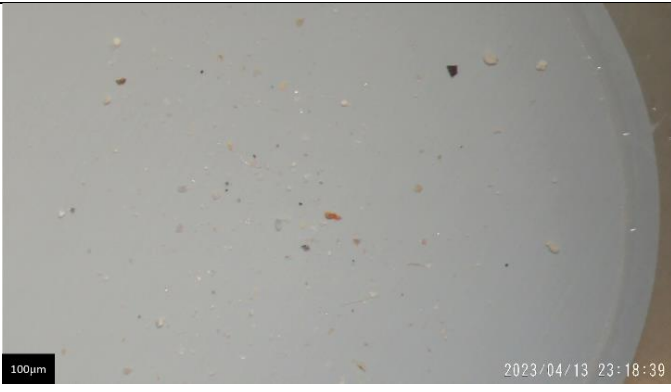
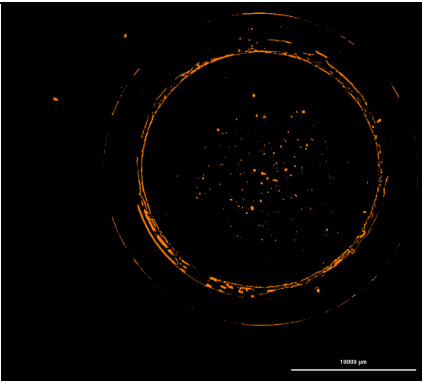
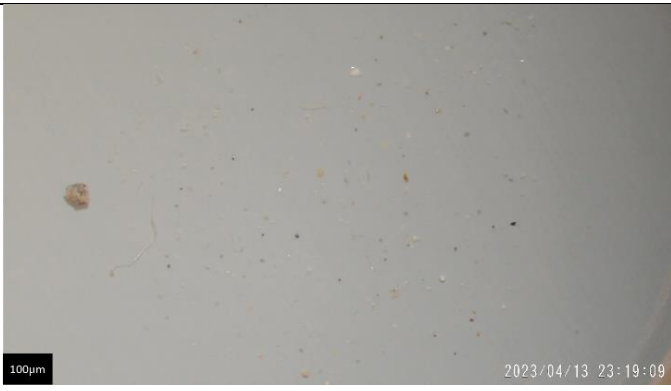
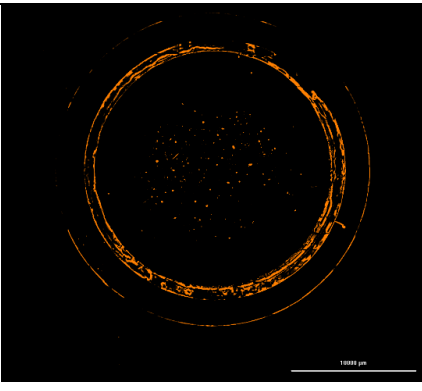

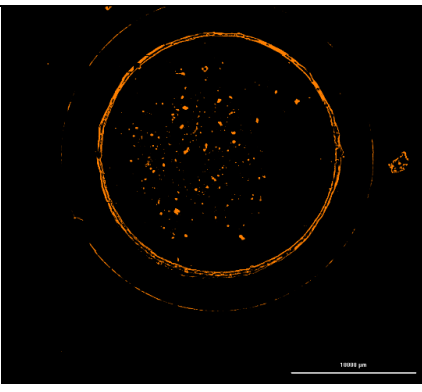
<p>0-9cm NW 1</p>		
<p>0-9cm NW 2</p>		
<p>0-9cm NW 3</p>		
<p>0-9cm West 1</p>		

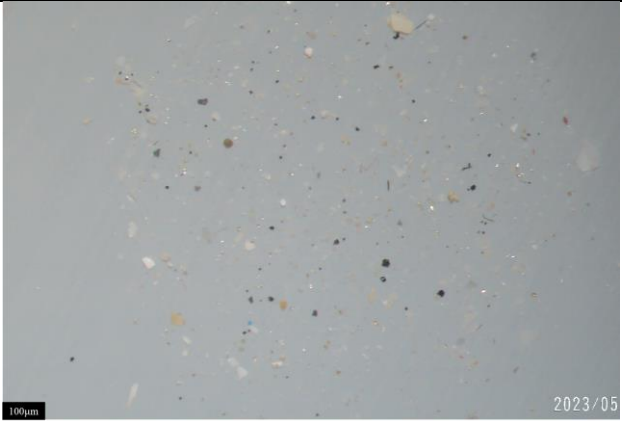
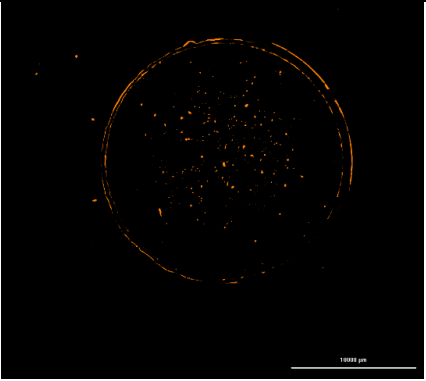

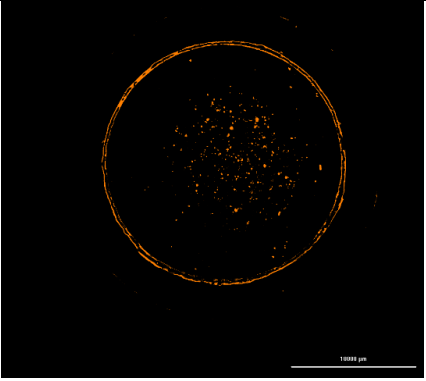
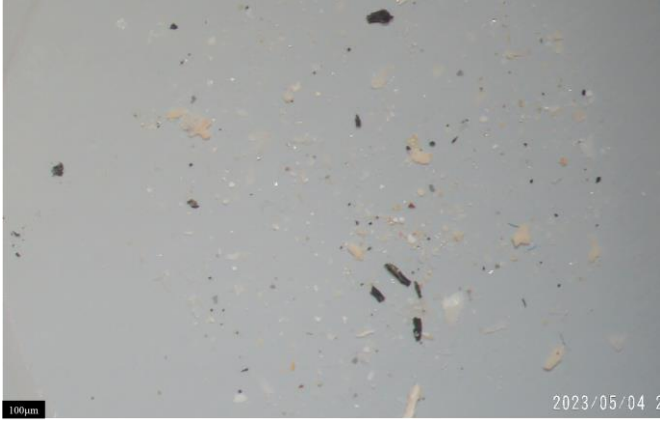
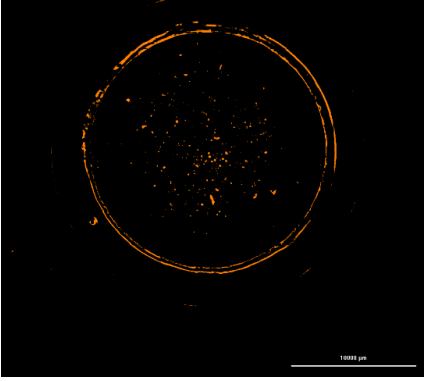
<p>0-9cm West 2</p>		
<p>0-9cm West 3</p>		
<p>0-9cm SW 1</p>		

<p>0-9cm SW 2</p>		
<p>0-9cm SW 3</p>		
<p>9-18cm North 1</p>		


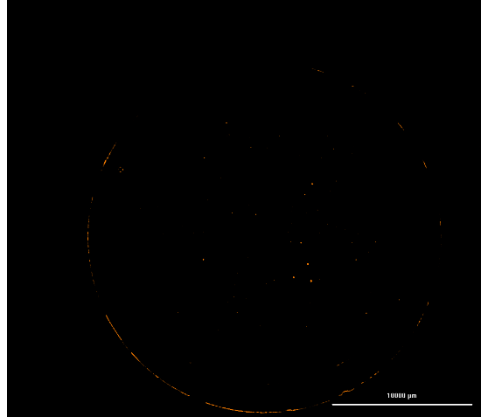

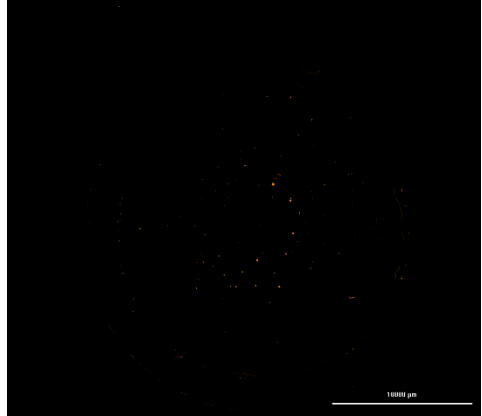
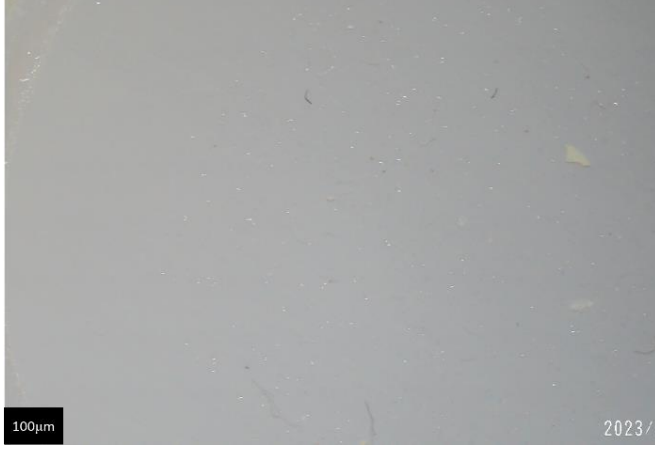
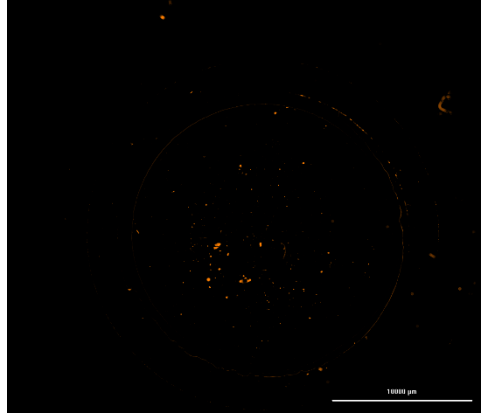



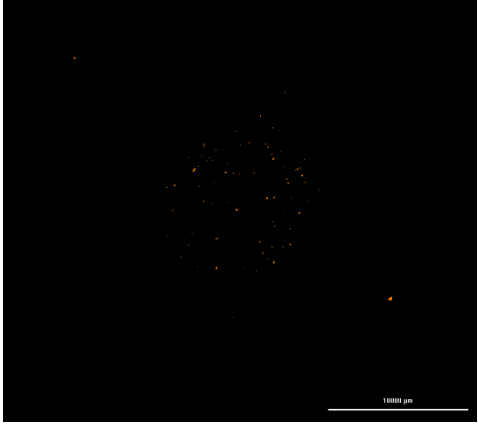

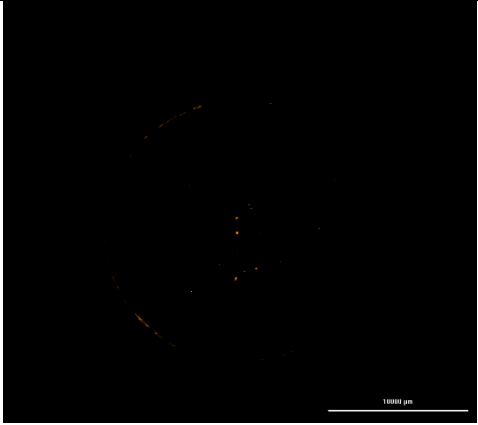
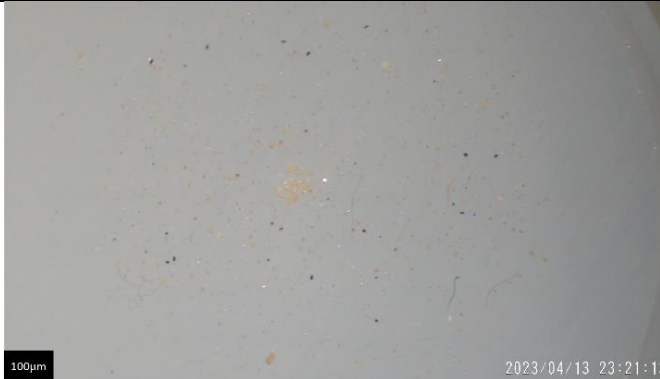
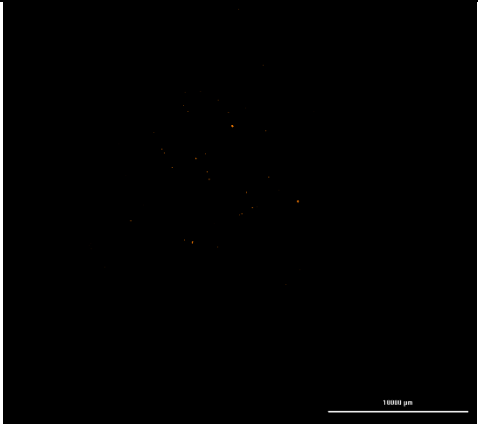
<p>9-18cm North 2</p>	 <p>100µm 2023/04/13 23:01:53</p>	 <p>10000 µm</p>
<p>9-18cm North 3</p>	 <p>100µm 2023/04/13 23:02:09</p>	 <p>10000 µm</p>
<p>9-18cm NW 1</p>	 <p>100µm 2023/04/13 23:17:33</p>	 <p>10000 µm</p>
<p>9-18cm NW 2</p>	 <p>100µm 2023/04/13 23:17:47</p>	 <p>10000 µm</p>


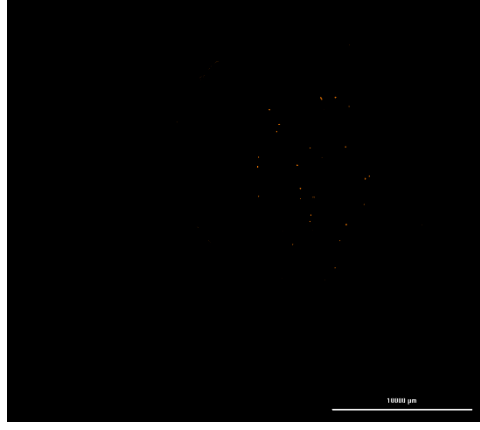

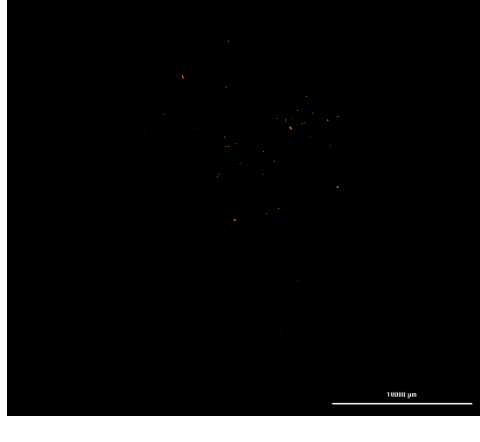

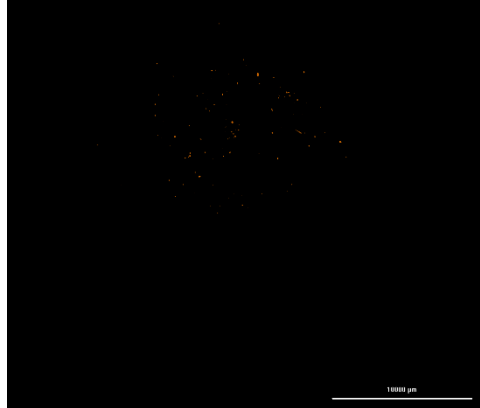
<p>9-18cm NW 3</p>		
<p>9-18cm West 1</p>		
<p>9-18cm West 2</p>		
<p>9-18cm West 3</p>		


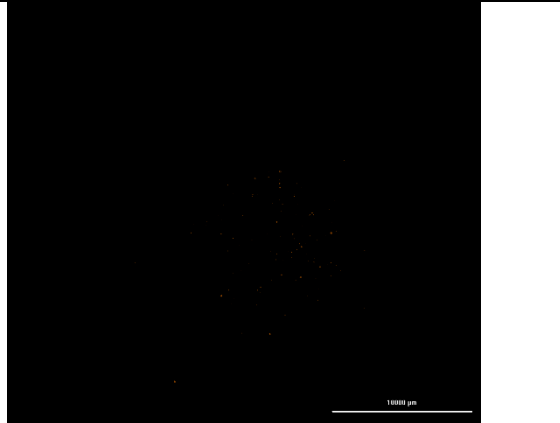
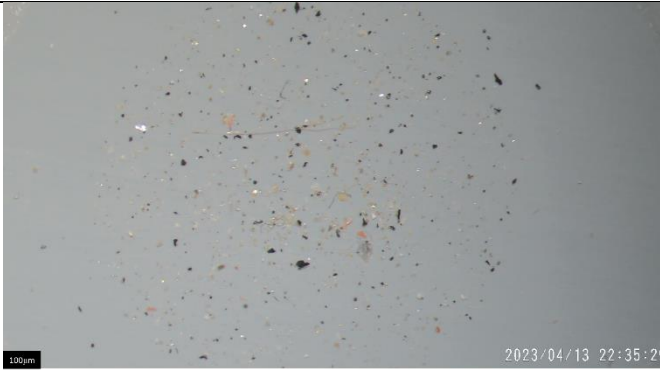
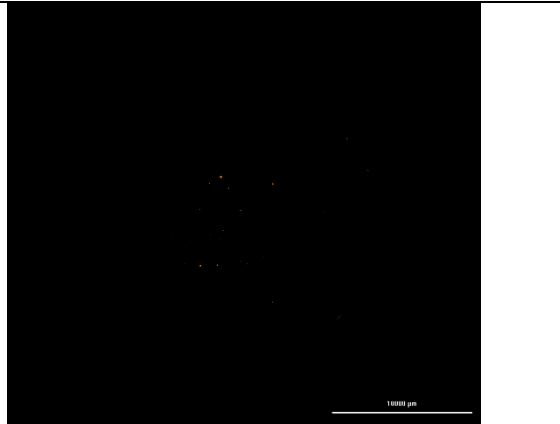

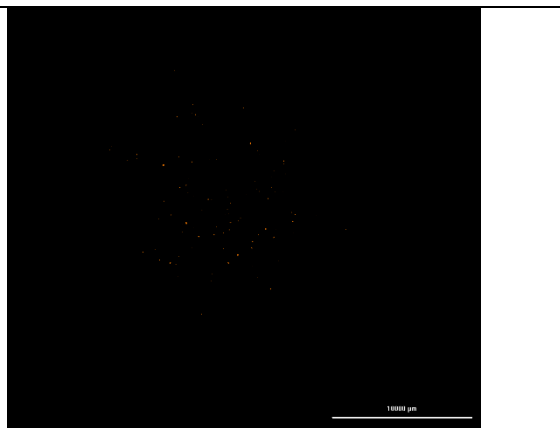
<p>9-18cm SW 1</p>		
<p>9-18cm SW 2</p>		
<p>9-18cm SW 3</p>		

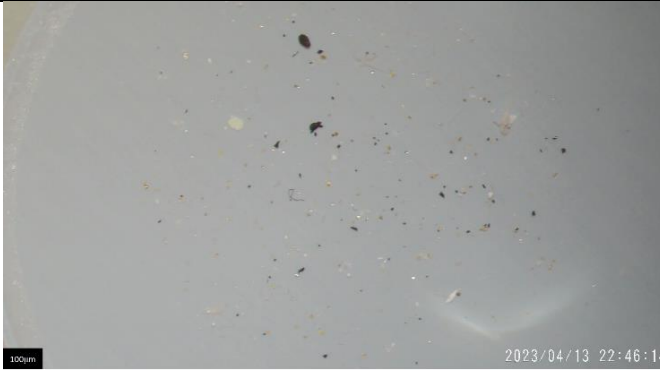
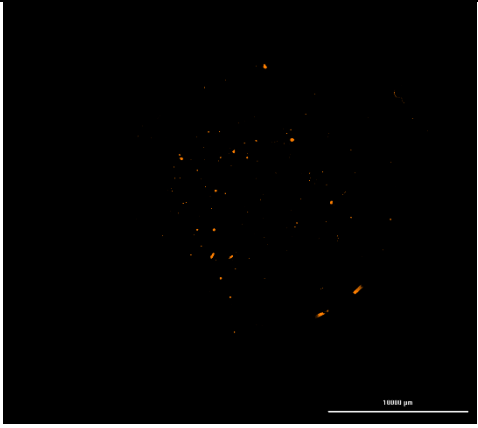
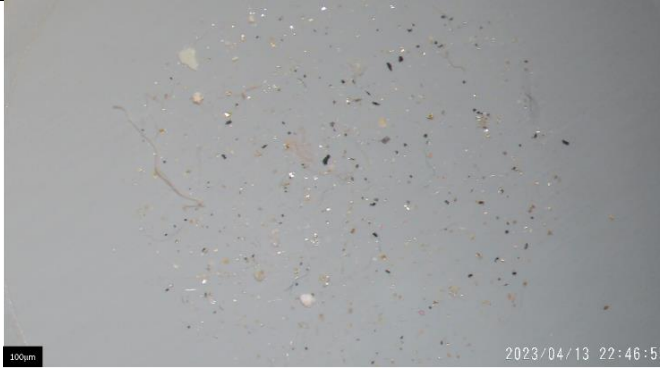
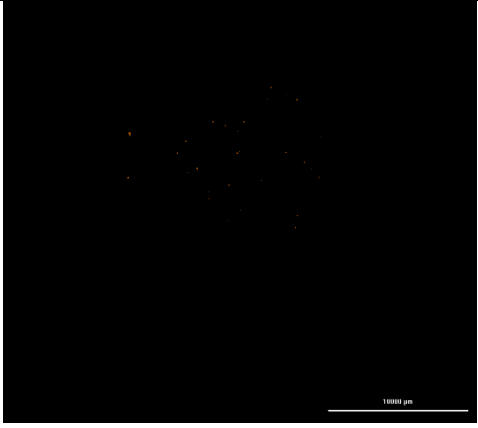

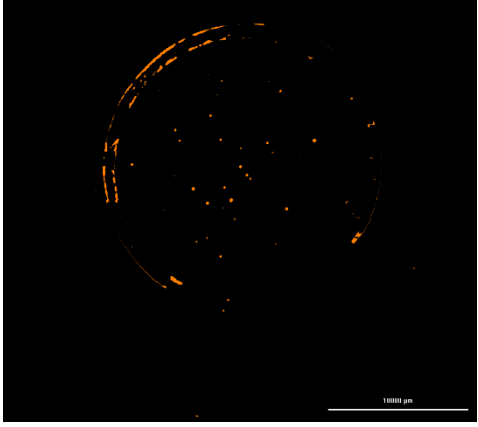
**Table S9.** Lab Control & Background Sites Stereomicroscopy & Fluorescence Microscopy

Lab Ctrl 1	 <p>100µm</p> <p>2023</p>	 <p>10000 µm</p>
Lab Ctrl 2	 <p>100µm</p> <p>2023/04/1</p>	 <p>10000 µm</p>
Lab Ctrl 3	 <p>100µm</p> <p>2023/0</p>	 <p>10000 µm</p>

<p>Tuttle OK 0- 9cm Backg round 1</p>		
<p>Tuttle OK 0- 9cm Backg round 2</p>		
<p>Tuttle OK 0- 9cm Backg round 3</p>		

<p>Tuttle OK 9- 18cm Backg round 1</p>		
<p>Tuttle OK 9- 18cm Backg round 2</p>		
<p>Tuttle OK 9- 18cm Backg round 3</p>		

<p>CABS /LG 0-9cm Backg round 1</p>		
<p>CABS /LG 0-9cm Backg round 2</p>		
<p>CABS /LG 0-9cm Backg round 3</p>		

<p>CABS /LG 9- 18cm Backg round 1</p>		
<p>CABS /LG 9- 18cm Backg round 2</p>		
<p>CABS /LG 9- 18cm Backg round 3</p>		



**Table S10.** ATR-FTIR Spectral Correlations from Tuttle Oklahoma Burn Site 0-9 cm Depth

Site-Quadrant-Depth-Particle ID	Polymer Type	Correlation (%)
Tuttle OK-West-Shallow-1	HDPE (#1) 8h 100C	96.6
Tuttle OK-West-Shallow-2	LDPE (#1) 8h 100C	94.9
Tuttle OK-West-Shallow-3	Polyethylene- not burnt	90.9
Tuttle OK-West-Shallow-4	PS (#1) 1h 300C	89.7
Tuttle OK-West-Shallow-5	Rayon (CV#1) 200C 24h	53.0
Tuttle OK-South-Shallow-1	PP (#2) 8h 100C	96.6
Tuttle OK-South-Shallow-2	Polyethylene- 1hr 100C	96.2
Tuttle OK-South-Shallow-3	Polyethylene- not burnt	94.1
Tuttle OK-South-Shallow-4	Silicone Polymer #1	73.3
Tuttle OK-South-Shallow-5	Rayon (CV #1) 1h 200C	69.6
Tuttle OK-East-Shallow-1	LDPE (#1) 1h 100C	98.7
Tuttle OK-East-Shallow-2	PS (#1) 24h 100C	98.6
Tuttle OK-East-Shallow-3	LDPE (#2) 2h 100C	98.6
Tuttle OK-East-Shallow-4	HDPE (#1) 8h 100C	98.6
Tuttle OK-East-Shallow-5	Octyl Benzylphthalate	48.4
Tuttle OK-North-Shallow-1	LDPE (#2) 2h 100C	98.5
Tuttle OK-North-Shallow-2	LLDPE (#1) 1h 200C	95.6
Tuttle OK-North-Shallow-3	PE (#2) 1h 100C	95.1
Tuttle OK-North-Shallow-4	PP (#2) 1h 200C	89.7
Tuttle OK-North-Shallow-5	PP (#2) 1h 200C	89.6
Tuttle OK-North-Shallow-6	PP (#2) 24h 100C	87.7
Tuttle OK-North-Shallow-7	PP (#2) 1h 200C	87.6
Tuttle OK-North-Shallow-8	Olefin	82.4
Tuttle OK-North-Shallow-9	PS (#1) 8h 100C	79.5
Tuttle OK-North-Shallow-10	Rayon (CV #1) 8h 200C	77.4
Tuttle OK-North-Shallow-11	ABS/PVC Blend	76.7
Tuttle OK-North-Shallow-12	Poly(Ethylene:Propylene:Diene)	70.9

**Table S11.** ATR-FTIR Spectral Matches from Tuttle Oklahoma Burn Site 9-18 cm Depth

<b>Site-Quadrant-Depth-Particle ID</b>	<b>Polymer Type</b>	<b>Match (%)</b>
Tuttle OK-West-Deep-1	LDPE (#2) 2h 100C	99.6
Tuttle OK- West -Deep-2	LDPE (#2) 2h 100C	99.0
Tuttle OK- West -Deep-3	LDPE (#1) 8h 100C	98.7
Tuttle OK- West -Deep-4	LDPE (#2) 2h 100C	98.7
Tuttle OK- West -Deep-5	LDPE (#1) 8h 100C	98.7
Tuttle OK- West -Deep-6	LDPE (#1) 1h 100C	98.4
Tuttle OK- West -Deep-7	PET (#2) 1h 100C	93.3
Tuttle OK-South-Deep-1	LDPE (#1) 24h 100C	96.5
Tuttle OK- South -Deep-2	LDPE (#1) 8h 100C	94.8
Tuttle OK- South -Deep-3	HDPE (#1) 24h 100C	92.9
Tuttle OK- South -Deep-4	Polyester- 2hr 100C	92.5
Tuttle OK- South -Deep-5	PE (#1) 1h 200C	89.6
Tuttle OK- South -Deep-6	PE (#1) 1h 200C	88.4
Tuttle OK- South -Deep-7	Polyethylene- 1hr 100C	87.5
Tuttle OK- South -Deep-8	Ethoxylated Stearyl Amine	84.9
Tuttle OK- South -Deep-9	PE (#1) 1h 200C	84.1
Tuttle OK- South -Deep-10	PE (#1) 1h 200C	83.8
Tuttle OK- South -Deep-11	LDPE (#1) 1h 200C	82.1
Tuttle OK- South -Deep-12	PE (#1) 1h 200C	82.1
Tuttle OK- South -Deep-13	LDPE (#2) 8h 100C	81.5
Tuttle OK- South -Deep-14	LLDPE (#1) 1h 200C	81.4
Tuttle OK- South -Deep-15	Aged Polyethylene NPs	79.3
Tuttle OK-East-Deep-1	LLDPE (#1) 1h 200C	97.9
Tuttle OK-East-Deep-2	PP (#2) 1h 200C	97.3
Tuttle OK-East-Deep-3	PP (#2) 8h 100C	95.7
Tuttle OK-East-Deep-4	PE (#3) 1h 100C	94.8
Tuttle OK-East-Deep-5	PE (#3) 1h 100C	90.8
Tuttle OK-North-Deep-1	LDPE (#2) 2h 100C	97.6
Tuttle OK-North-Deep-2	PE (#2) 1h 100C	93.3
Tuttle OK-North-Deep-3	Rayon (CV#1) 8h 200C	72.8
Tuttle OK-North-Deep-4	Rayon (CV #1) 8h 200C	72.1
Tuttle OK-North-Deep-5	Rayon (CV#1) 24h 200C	70.6

**Table S12. ATR-FTIR Spectral Matches from Crow Agency Burn Site 0-9 cm Depth**

Site-Quadrant-Depth-Particle ID	Polymer Type	Match (%)
CABS-NW-Shallow-1	LLDPE (#1) 1h 200C	99.3
CABS-NW-Shallow-2	HDPE (#1) 8h 100C	99.19
CABS-NW-Shallow-3	PS (#2) 1h 300C	98.91
CABS-NW-Shallow-4	LLDPE (#1) 1h 200C	98.79
CABS-NW-Shallow-5	HDPE (#2) 2h 100C	98.66
CABS-NW-Shallow-6	HDPE (#1) 2h 100C	98.57
CABS-NW-Shallow-7	PE (#1) 8h 100C	98.47
CABS-NW-Shallow-8	LDPE (#2) 2h 100C	98.05
CABS-NW-Shallow-9	PE (#1) 1h 100C	97.83
CABS-NW-Shallow-10	LDPE (#2) 2h 100C	97.42
CABS-NW-Shallow-11	PET (#2) 1h 100C	96.95
CABS-NW-Shallow-12	Acrylic Polymer #1	88.51
CABS-NW-Shallow-13	PE (#2) 1h 100C	84.53
CABS-NW-Shallow-14	PharMed (PP-based thermoplastic)	82.56
CABS-NW-Shallow-15	Poly(Vinyl Chloride)	82.18
CABS-NE-Shallow-1	Polyethylene - 1h 100C	98.39
CABS-NE-Shallow-2	HDPE (#1) 1h 100C	97.89
CABS-NE-Shallow-3	PP (#2) 8h 100C	97.55
CABS-NE-Shallow-4	LDPE (#1) 8h 100C	96.74
CABS-NE-Shallow-5	PE (#1) 8h 100C	96.57
CABS-NE-Shallow-6	Rayon (CV#1) 1h 100C	96.57
CABS-NE-Shallow-7	LLDPE (#1) 1h 200C	95.62
CABS-NE-Shallow-8	PP (#2) 1h 200C	94.06
CABS-NE-Shallow-9	LDPE (#1) 2h 300C	93.83
CABS-NE-Shallow-10	Polyethylene - not burnt	93.38
CABS-NE-Shallow-11	UV Aged Polystyrene	93.23
CABS-NE-Shallow-12	PP (#2) 1h 200C	91.88
CABS-NE-Shallow-13	Rayon (CV #1) 8h 100C	75.31
CABS-NE-Shallow-14	Silicone Polymer #1	75.26
CABS-NE-Shallow-15	Rayon (CV#1) 1h 200C	66.91
CABS-SW-Shallow-1	LLDPE (#1) 1h 200C	99.59
CABS-SW-Shallow-2	LLDPE (#1) 1h 200C	99.53
CABS-SW-Shallow-3	HDPE (#2) 8h 100C	99.33
CABS-SW-Shallow-4	HDPE (#1) 1h 100C	99.16
CABS-SW-Shallow-5	HDPE (#1) 1h 100C	98.87
CABS-SW-Shallow-6	UV Aged Polystyrene	98.8
CABS-SW-Shallow-7	LDPE (#2) 2h 100C	98.8
CABS-SW-Shallow-8	HDPE (#1) 8h 100C	98.01
CABS-SW-Shallow-9	HDPE (#2) 8h 100C	96.69
CABS-SW-Shallow-10	LDPE (#1) 8h 100C	96.51
CABS-SW-Shallow-11	Rayon (CV #1) 1h 100C	95.39
CABS-SW-Shallow-12	Polyethylene -1h 100C	94.9
CABS-SW-Shallow-13	LLDPE (#1) 1h 200C	91.3
CABS-SW-Shallow-14	LDPE (#2) 24h 300C	85.04
CABS-SW-Shallow-15	PVC (#2) 1h 200C	61.56
CABS-SE-Shallow	n/a due to excessive ash	n/a

**Table S13. ATR-FTIR Spectral Matches from Crow Agency Burn Site 9-18 cm Depth**

Site-Quadrant-Depth-Particle ID	Polymer Type	Match (%)
CABS-NW-Deep-1	PP (#2) 8h 100C	98.54
CABS-NW-Deep-2	PP (#2) 8h 100C	98.51
CABS-NW-Deep-3	LDPE (#2) 24h 300C	98.35
CABS-NW-Deep-4	PP (#2) 8h 100C	98.32
CABS-NW-Deep-5	HDPE (#1) 8h 100C	98.29
CABS-NW-Deep-6	HDPE (#1) 1h 100C	97.8
CABS-NW-Deep-7	LDPE (#1) 24h 100C	95.4
CABS-NW-Deep-8	LDPE (#1) 2h 100C	94.94
CABS-NW-Deep-9	PP (#2) 8h 100C	89.23
CABS-NW-Deep-10	Poly(Vinyl Chloride)	88.28
CABS-NW-Deep-11	EVA Foam Concentrate, 20% Azodicarbonamide #1	84.07
CABS-NW-Deep-12	PharMed (PP based thermoplastic)	81.96
CABS-NW-Deep-13	Olefin	80.45
CABS-NW-Deep-14	Poly(Ethylene:Propylene:Diene)	68.73
CABS-NW-Deep-15	Poly(Ethylene:Propylene:Diene)	64.1
CABS-NE-Deep-1	LDPE (#2) 2h 100C	99.4
CABS-NE-Deep-2	LDPE (#2) 2h 100C	99.35
CABS-NE-Deep-3	Pristine Polyethylene NPs	99.34
CABS-NE-Deep-4	PS (#2) 1h 100C	99.3
CABS-NE-Deep-5	LDPE (#2) 2h 100C	98.38
CABS-NE-Deep-6	PP (#2) 24h 100C	98.13
CABS-NE-Deep-7	HDPE (#1) 8h 100C	97.38
CABS-NE-Deep-8	PE (#3) 1h 100C	97.13
CABS-NE-Deep-9	UV Aged Polystyrene	96.65
CABS-NE-Deep-10	LDPE (#1) 8h 100C	95.87
CABS-NE-Deep-11	LLDPE (#1) 1h 200C	94.28
CABS-NE-Deep-12	UV Aged Polyethylene NPs	91.34
CABS-NE-Deep-13	Pristine Polyethylene NPs	89.39
CABS-NE-Deep-14	PP (#2) 8h 100C	85.16
CABS-SW-Deep-1	LLDPE (#1) 1h 200C	99.42
CABS-SW-Deep-2	LLDPE (#1) 1h 200C	99.31
CABS-SW-Deep-3	LLDPE (#1) 1h 200C	99.14
CABS-SW-Deep-4	LLDPE (#1) 8h 100C	99.05
CABS-SW-Deep-5	LDPE (#2) 2h 100C	99.03
CABS-SW-Deep-6	LDPE (#2) 2h 100C	98.95
CABS-SW-Deep-7	PE (#1) 8h 100C	98.78
CABS-SW-Deep-8	HDPE (#1) 2h 100C	98.78
CABS-SW-Deep-9	PS (#2) 1h 300C	98.57
CABS-SW-Deep-10	LLDPE (#1) 1h 200C	98.5
CABS-SW-Deep-11	HDPE (#1) 1h 100C	98
CABS-SW-Deep-12	HDPE (#1) 1h 100C	97.94
CABS-SW-Deep-13	LLDPE (#1) 1h 200C	95.64
CABS-SW-Deep-14	Alkyd Resin	85.83
CABS-SW-Deep-15	Acrylic Polymer #1	83.74
CABS-SE-Deep-1	PS (#3) 24h 100C	99.82
CABS-SE-Deep-2	LLDPE (#1) 1h 200C	98.95
CABS-SE-Deep-3	LLDPE (#1) 1h 200C	98.93
CABS-SE-Deep-4	PE (#2) 1h 100C	98.24
CABS-SE-Deep-5	LLDPE (#1) 1h 200C	97.79
CABS-SE-Deep-6	Polyethylene - not burnt	96.99
CABS-SE-Deep-7	Pristine Polyethylene NPs	96.87
CABS-SE-Deep-8	LDPE (#1) 24h 100C	96.82
CABS-SE-Deep-9	LDPE (#1) 8h 100C	96.4
CABS-SE-Deep-10	Pristine Polyethylene NPs	94.1
CABS-SE-Deep-11	LLDPE (#1) 1h 200C	91.9
CABS-SE-Deep-12	PP (#2) 1h 200C	89.56
CABS-SE-Deep-13	Ethoxylated Stearyl Amine	88.86
CABS-SE-Deep-14	Aged Polyethylene NPs	69.37
CABS-SE-Deep-15	PP (#2) 8h 100C	63.31

**Table S14. ATR-FTIR Spectral Matches from Lodge Grass Dump Site 0-9 cm Depth**

Site-Quadrant-Depth-Particle ID	Polymer Type	Match (%)
LG-N-Shallow-1	PS (#3) 1h 100C	99.87
LG-N-Shallow-2	LLDPE (#1) 1h 200C	99.29
LG-N-Shallow-3	LLDPE (#1) 1h 200C	99.21
LG-N-Shallow-4	LLDPE (#1) 1h 200C	98.78
LG-N-Shallow-5	LLDPE (#1) 1h 200C	98.68
LG-N-Shallow-6	HDPE (#1) 8h 100C	97.75
LG-N-Shallow-7	LDPE (#2) 2h 100C	97.60
LG-N-Shallow-8	HDPE (#1) 8h 100C	97.21
LG-N-Shallow-9	LDPE (#2) 8h 100C	96.36
LG-N-Shallow-10	LDPE (#2) 2h 100C	95.93
LG-N-Shallow-11	Polyethylene/Millad Blend	91.82
LG-N-Shallow-12	LLDPE (#1) 1h 200C	87.49
LG-N-Shallow-13	ABS/PVC Blend	74.52
LG-N-Shallow-14	Aged Polyethylene NPs	74.05
LG-N-Shallow-15	Rayon (CV #1) 200C 24h	66.20
LG-NW-Shallow-1	HDPE (#1) 8h 100C	99.44
LG-NW-Shallow-2	HDPE (#1) 8h 100C	98.76
LG-NW-Shallow-3	PE (#3) 1h 100C	98.71
LG-NW-Shallow-4	PE (#3) 1h 100C	98.69
LG-NW-Shallow-5	LLDPE (#1) 1h 200C	98.41
LG-NW-Shallow-6	HDPE (#1) 8h 100C	98.33
LG-NW-Shallow-7	LLDPE (#1) 1h 200C	98.33
LG-NW-Shallow-8	HDPE (#1) 8h 100C	97.79
LG-NW-Shallow-9	LDPE (#2) 24h 300C	97.54
LG-NW-Shallow-10	HDPE (#1) 8h 100C	96.83
LG-NW-Shallow-11	HDPE (#1) 8h 100C	96.83
LG-NW-Shallow-12	LDPE (#2) 8h 100C	96.02
LG-NW-Shallow-13	LLDPE (#1) 1h 200C	94.66
LG-NW-Shallow-14	LLDPE (#1) 1h 200C	94.36
LG-NW-Shallow-15	LLDPE (#1) 1h 200C	58.28
LG-W-Shallow-1	PE (#3) 1h 100C	99.23
LG-W-Shallow-2	PE (#3) 1h 100C	99.22
LG-W-Shallow-3	LDPE (#2) 2h 100C	99.22
LG-W-Shallow-4	PE (#3) 1h 100C	99.11
LG-W-Shallow-5	Pristine Polyethylene NPs	99.05
LG-W-Shallow-6	HDPE (#1) 1h 100C	98.34
LG-W-Shallow-7	HDPE (#1) 8h 100C	98.04
LG-W-Shallow-8	HDPE (#2) 1h 100C	97.97
LG-W-Shallow-9	PET (#2) 1h 100C	97.83
LG-W-Shallow-10	PE (#2) 1h 100C	95.83
LG-W-Shallow-11	PET (#2) 1h 100C	95.60
LG-W-Shallow-12	PET (#1) 1h 200C	86.64
LG-W-Shallow-13	Polyethylene white layer (TiO2)	82.68
LG-W-Shallow-14	PE (#1) 1h 200C	80.11
LG-W-Shallow-15	Olefin	55.16
LG-SW-Shallow-1	PS (#3) 24h 100C	99.77
LG-SW-Shallow-2	LDPE (#2) 2h 100C	99.23
LG-SW-Shallow-3	HDPE (#1) 8h 100C	98.99
LG-SW-Shallow-4	PE (#1) 8h 100C	98.68
LG-SW-Shallow-5	PE (#3) 1h 100C	98.60
LG-SW-Shallow-6	LDPE (#2) 2h 100C	98.60
LG-SW-Shallow-7	LDPE (#1) 1h 100C	98.57
LG-SW-Shallow-8	LDPE (#2) 2h 100C	98.49
LG-SW-Shallow-9	LDPE (#2) 2h 100C	98.42
LG-SW-Shallow-10	PE (#1) 8h 100C	98.18
LG-SW-Shallow-11	LDPE (#2) 2h 100C	97.99
LG-SW-Shallow-12	LDPE (#2) 2h 100C	94.99
LG-SW-Shallow-13	HDPE (#1) 8h 100C	88.80
LG-SW-Shallow-14	Aged Polyethylene NPs	87.25
LG-SW-Shallow-15	Rayon (CV #1) 200C 24h	68.54

**Table S15.** ATR-FTIR Spectral Matches from Lodge Grass Dump Site 9-18 cm Depth

Site-Quadrant-Depth-Particle ID	Polymer Type	Match (%)
LG-N-Deep-1	HDPE (#1) 8h 100C	99.11
LG-N-Deep-2	PE (#3) 1h 100C	99.04
LG-N-Deep-3	HDPE (#1) 8h 100C	98.91
LG-N-Deep-4	PE (#3) 1h 100C	98.82
LG-N-Deep-5	PE (#3) 1h 100C	98.74
LG-N-Deep-6	PE (#3) 1h 100C	98.72
LG-N-Deep-7	LDPE (#2) 2h 100C	98.52
LG-N-Deep-8	PE (#3) 1h 100C	98.46
LG-N-Deep-9	PE (#2) 1h 100C	98.46
LG-N-Deep-10	PE (#3) 1h 100C	98.38
LG-N-Deep-11	PE (#3) 1h 100C	98.33
LG-N-Deep-12	LLDPE (#1) 1h 200C	98.08
LG-N-Deep-13	LDPE (#1) 24h 100C	96.94
LG-N-Deep-14	LDPE (#2) 2h 100C	94.11
LG-N-Deep-15	PE (#2) 1h 100C	92.58
LG-NW-Deep-1	LDPE (#2) 2h 100C	99.23
LG-NW-Deep-2	HDPE (#1) 8h 100C	98.71
LG-NW-Deep-3	HDPE (#1) 8h 100C	98.11
LG-NW-Deep-4	LLDPE (#1) 8h 100C	97.63
LG-NW-Deep-5	LDPE (#1) 1h 100C	96.53
LG-NW-Deep-6	PE (#3) 1h 100C	93.62
LG-NW-Deep-7	Pristine Polyethylene NPs	93.33
LG-NW-Deep-8	PE (#1) 1h 100C	89.99
LG-NW-Deep-9	Silicone Polymer #1	79.37
LG-NW-Deep-10	Silicone Polymer #1	76.11
LG-NW-Deep-11	LDPE (#2) 8h 100C	75.75
LG-NW-Deep-12	Olefin	53.44
LG-NW-Deep-13	PE (#2) 8h 100C	51.27
LG-NW-Deep-14	LLDPE (#1) 1h 200C	43.29
LG-NW-Deep-15	Alumina Silicate #1	37.66
LG-W-Deep-1	Pristine Polyethylene NPs	99.40
LG-W-Deep-2	PE (#3) 1h 100C	98.86
LG-W-Deep-3	Pristine Polyethylene NPs	98.78
LG-W-Deep-4	LDPE (#2) 2h 100C	98.70
LG-W-Deep-5	PE (#1) 8h 100C	98.26
LG-W-Deep-6	LLDPE (#1) 1h 200C	97.93
LG-W-Deep-7	Rayon (CV#1) 1h 100C	97.66
LG-W-Deep-8	LLDPE (#1) 1h 200C	97.10
LG-W-Deep-9	HDPE (#2) 8h 100C	96.18
LG-W-Deep-10	PS (#2) 24h 100C	95.82
LG-W-Deep-11	HDPE (#2) 2h 200C	93.78
LG-W-Deep-12	Rayon (CV#1) 8h 100C	91.15
LG-W-Deep-13	LLDPE (#1) 8h 100C	88.18
LG-W-Deep-14	PS (#1) 1h 300C	75.58
LG-W-Deep-15	Polyester (TS) #7	74.47
LG-SW-Deep-1	PS (#3) 24h 100C	99.63
LG-SW-Deep-2	LDPE (#2) 2h 100C	99.08
LG-SW-Deep-3	HDPE (#1) 1h 100C	99.06
LG-SW-Deep-4	Pristine Polyethylene NPs	98.55
LG-SW-Deep-5	LLDPE (#1) 1h 200C	98.45
LG-SW-Deep-6	HDPE (#1) 1h 100C	98.27
LG-SW-Deep-7	HDPE (#1) 1h 100C	97.91
LG-SW-Deep-8	HDPE (#1) 1h 100C	97.61
LG-SW-Deep-9	Pristine Polyethylene NPs	97.50
LG-SW-Deep-10	LDPE (#1) 8h 100C	97.37
LG-SW-Deep-11	LDPE (#2) 2h 100C	96.74

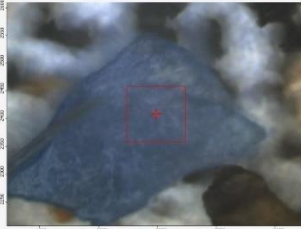
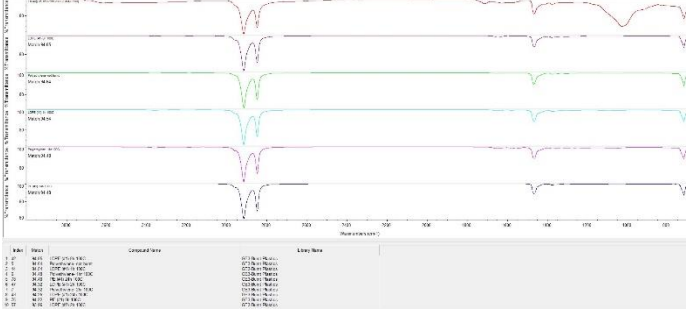

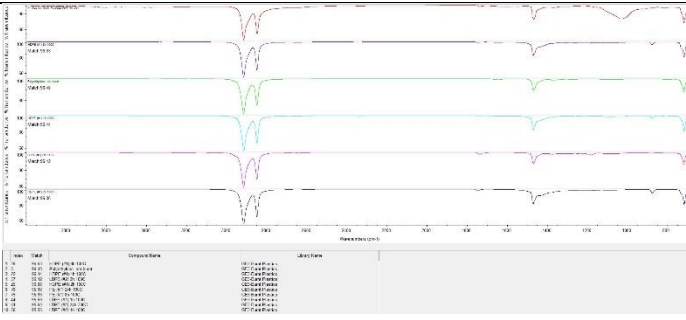

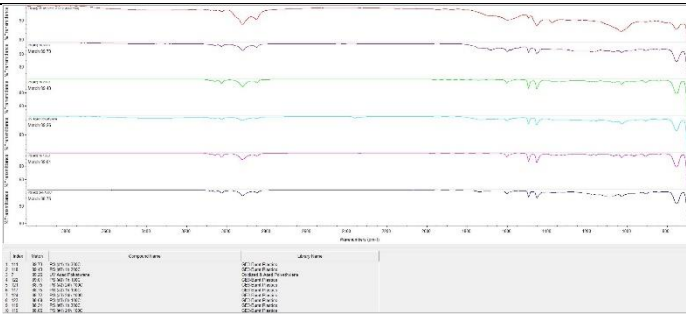

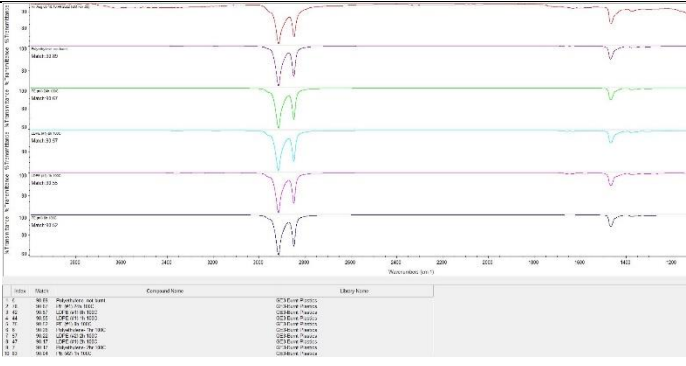
LG-SW-Deep-12	HDPE (#1) 8h 100C	95.90
LG-SW-Deep-13	HDPE (#1) 1h 100C	93.45
LG-SW-Deep-14	Silicone Polymer #1	92.33
LG-SW-Deep-15	Polyethylene- not burnt	73.90

**Table S16.** ATR-FTIR Spectral Matches from Lab Control and Background Sites

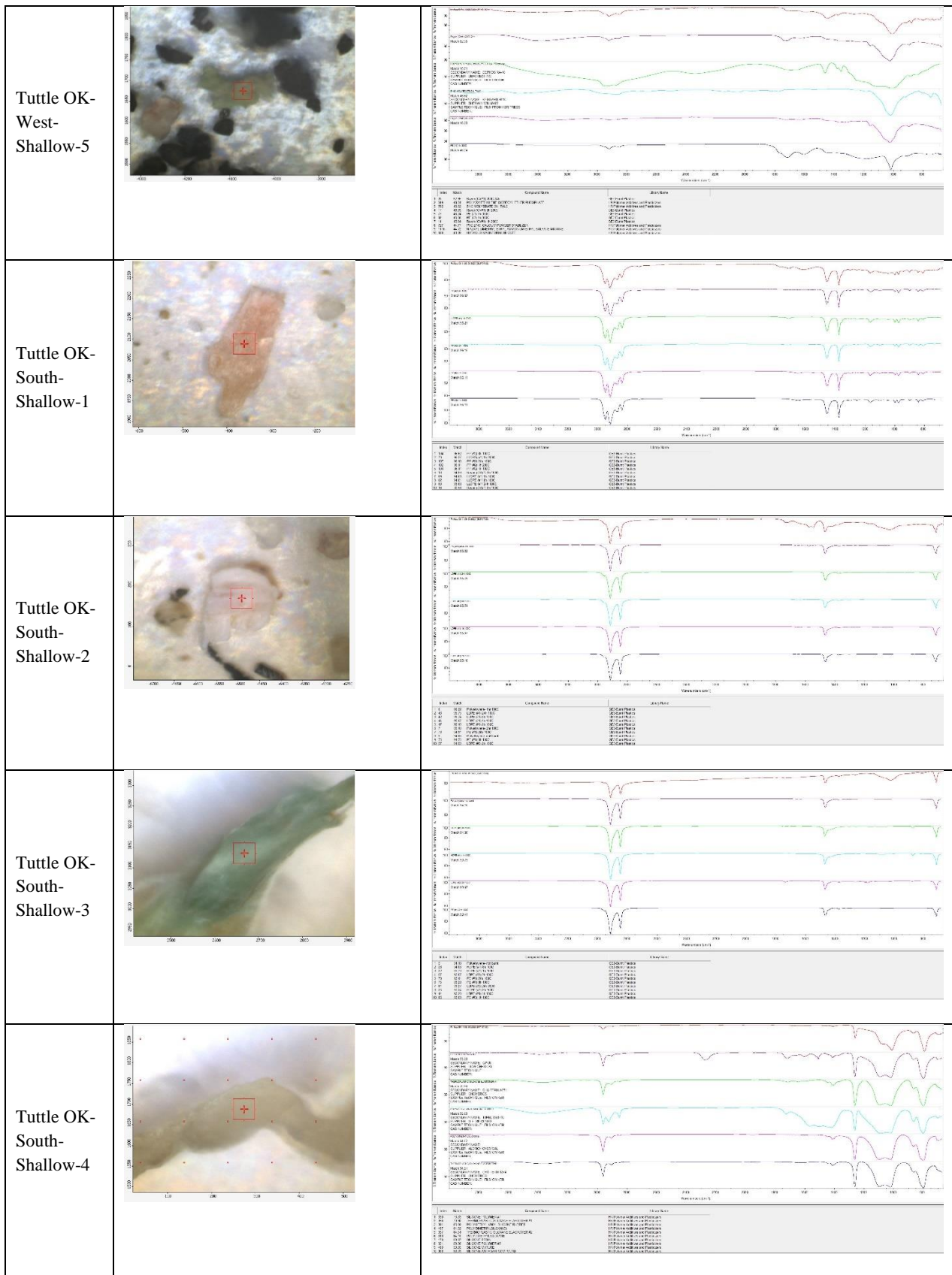
Sample	Particle ID	Match	Match (%)
Lab Control	Lab-1	Titanium Oxide (98%), Aluminum Oxide (2%)	68.1
	Lab-2	Bis(2-Hydroxy-5-T-Octyl-3-(Benzotriazole-2-YL) Phenyl Amine	34.0
	Lab-3	<b>LDPE (#1) 1h 100C</b>	<b>98.9</b>
	Lab-4	<b>PP (#2) 8h 100C</b>	<b>97.0</b>
	Lab-5	Antimony Trioxide	52.8
Crow Agency & Lodge Grass Background 0-9cm Core	CABS&LG- Background-Shallow-1	<b>LLDPE (#1) 1h 200C</b>	<b>97.76</b>
	CABS&LG- Background-Shallow-2	<b>Pristine Polyethylene NPs</b>	<b>82.7</b>
	CABS&LG- Background-Shallow-3	<b>LDPE (#2) 24h 300C</b>	<b>70.57</b>
	CABS&LG- Background-Shallow-4	<b>PP (#2) 24h 100C</b>	<b>94.09</b>
	CABS&LG- Background-Shallow-5	<b>Polyethylene - not burnt</b>	<b>97.47</b>
Crow Agency & Lodge Grass Background 9-18cm Core	CABS&LG- Background-Deep-1	<b>Rayon</b>	<b>70.02</b>
	CABS&LG- Background-Deep-2	<b>LLDPE (#1) 24h 100C</b>	<b>96.01</b>
	CABS&LG- Background-Deep-3	<b>LDPE (#2) 1h 100C</b>	<b>99.4</b>
	CABS&LG- Background-Deep-4	<b>Rayon (CV #1) 24h 200C</b>	<b>77.42</b>
	CABS&LG- Background-Deep-5	<b>LLDPE (#1) 1h 200C</b>	<b>83.54</b>
Tuttle Oklahoma Background 0-9cm Core	Tuttle OK-Background-Shallow-1	<b>HDPE (#1) 24h 100C</b>	<b>72.92</b>
	Tuttle OK-Background-Shallow-2	<b>Pristine Polyethylene NPs</b>	<b>83.13</b>
	Tuttle OK-Background-Shallow-3	Ground Calcium Carbonate #4	26.57
	Tuttle OK-Background-Shallow-4	Poly(MethylPhenylSiloxane)	47.23
	Tuttle OK-Background-Shallow-5	Cadmium, Zinc, Barium Sulfide Blend	47.35
Tuttle Oklahoma Background 9-18cm Core	Tuttle OK-Deep-Shallow-1	<b>LDPE (#1) 24h 100C</b>	<b>96.93</b>
	Tuttle OK-Deep-Shallow-2	Titanium Oxide (98%), Aluminum Oxide (2%)	44.76
	Tuttle OK-Deep-Shallow-3	Antimony Trioxide	47.77
	Tuttle OK-Deep-Shallow-4	Alkyd Resin	40.17
	Tuttle OK-Deep-Shallow-5	<b>PP (#2) 8h 100C</b>	<b>84.91</b>

\*bold indicates a confirmed MP

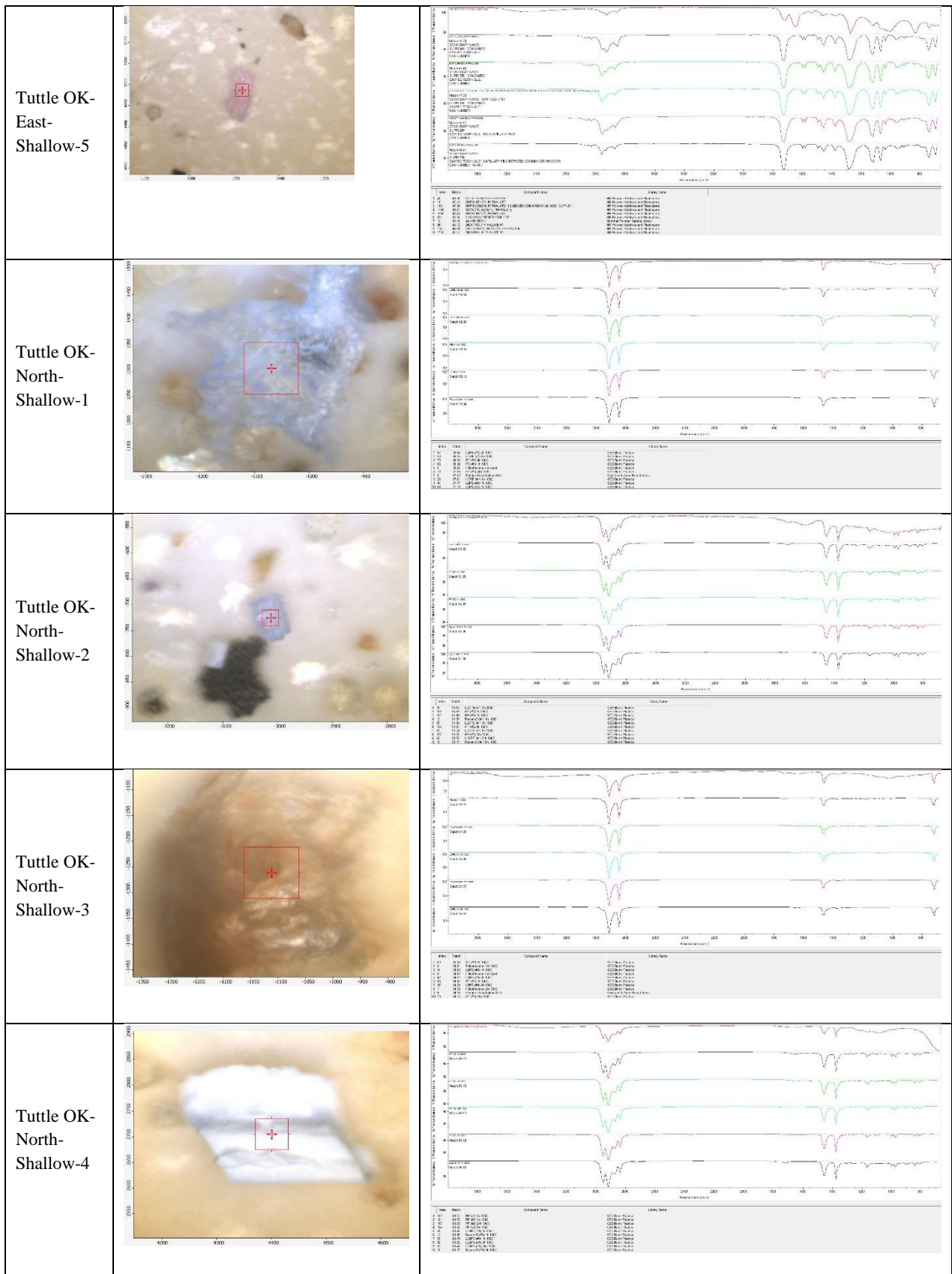
**Table S17: Tuttle Oklahoma Burn Site ATR-FTIR Particle and Spectra Images**

<p>Tuttle OK- West- Shallow-1</p>		
<p>Tuttle OK- West- Shallow-2</p>		
<p>Tuttle OK- West- Shallow-3</p>		
<p>Tuttle OK- West- Shallow-4</p>		

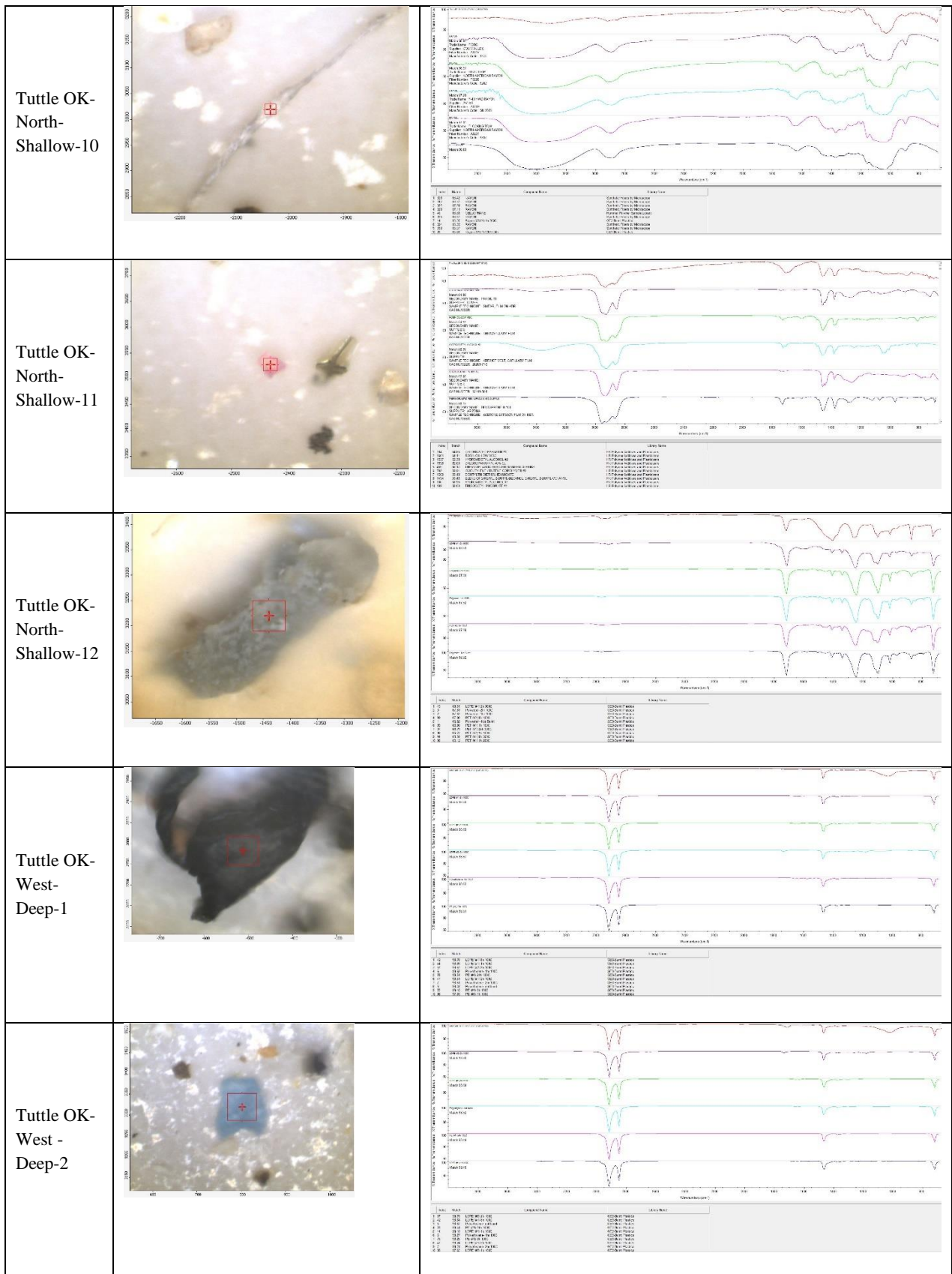


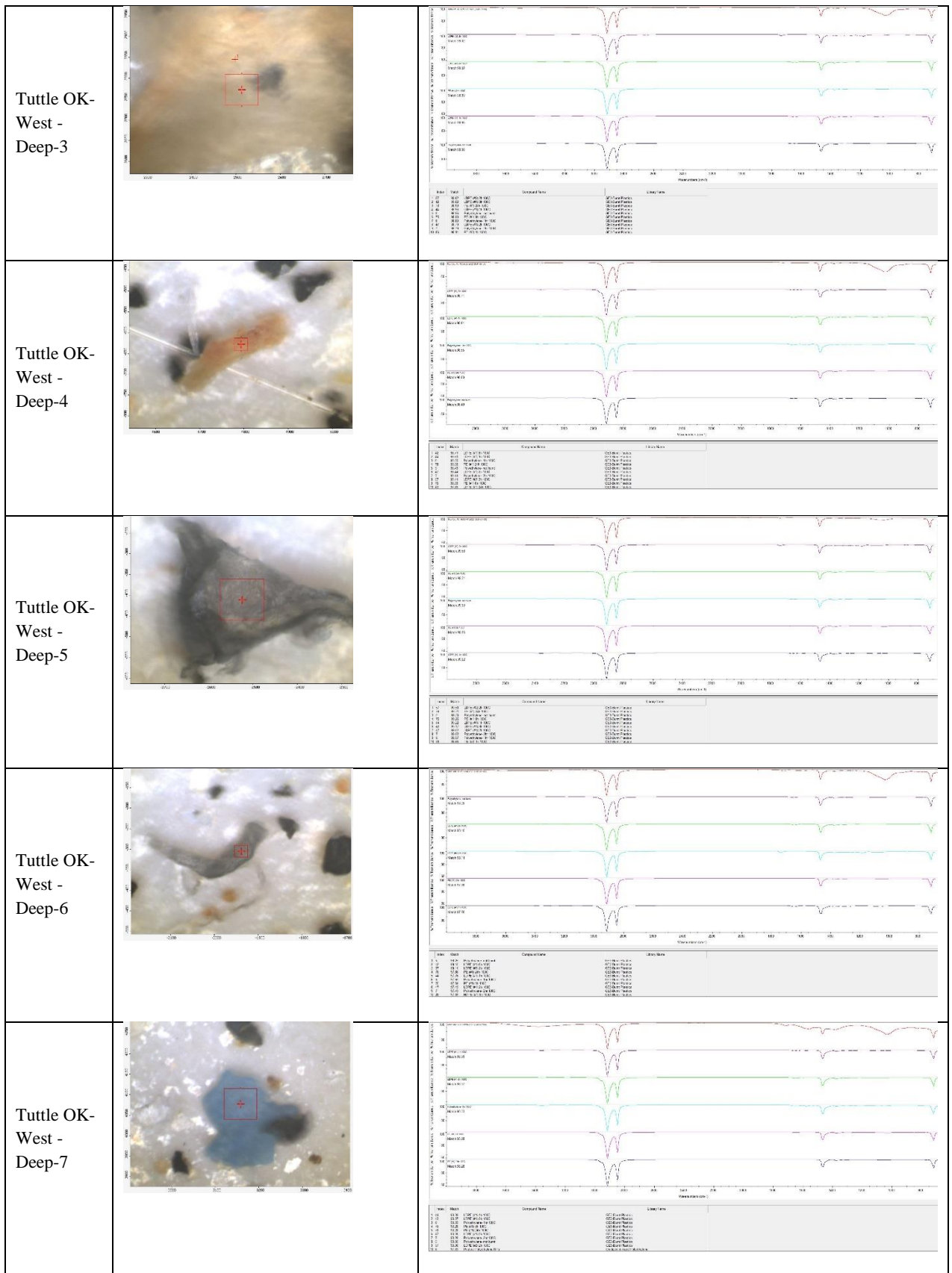




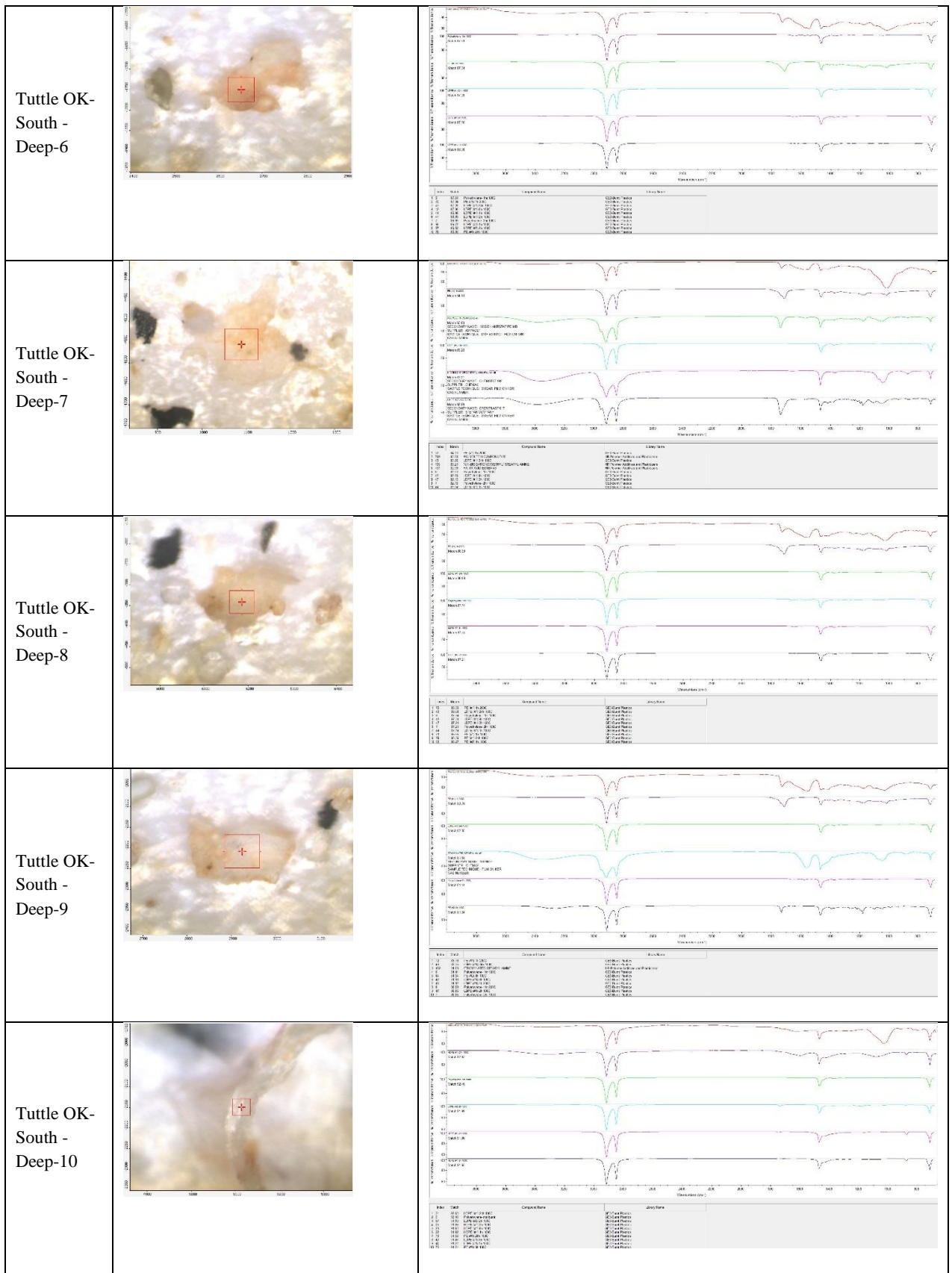






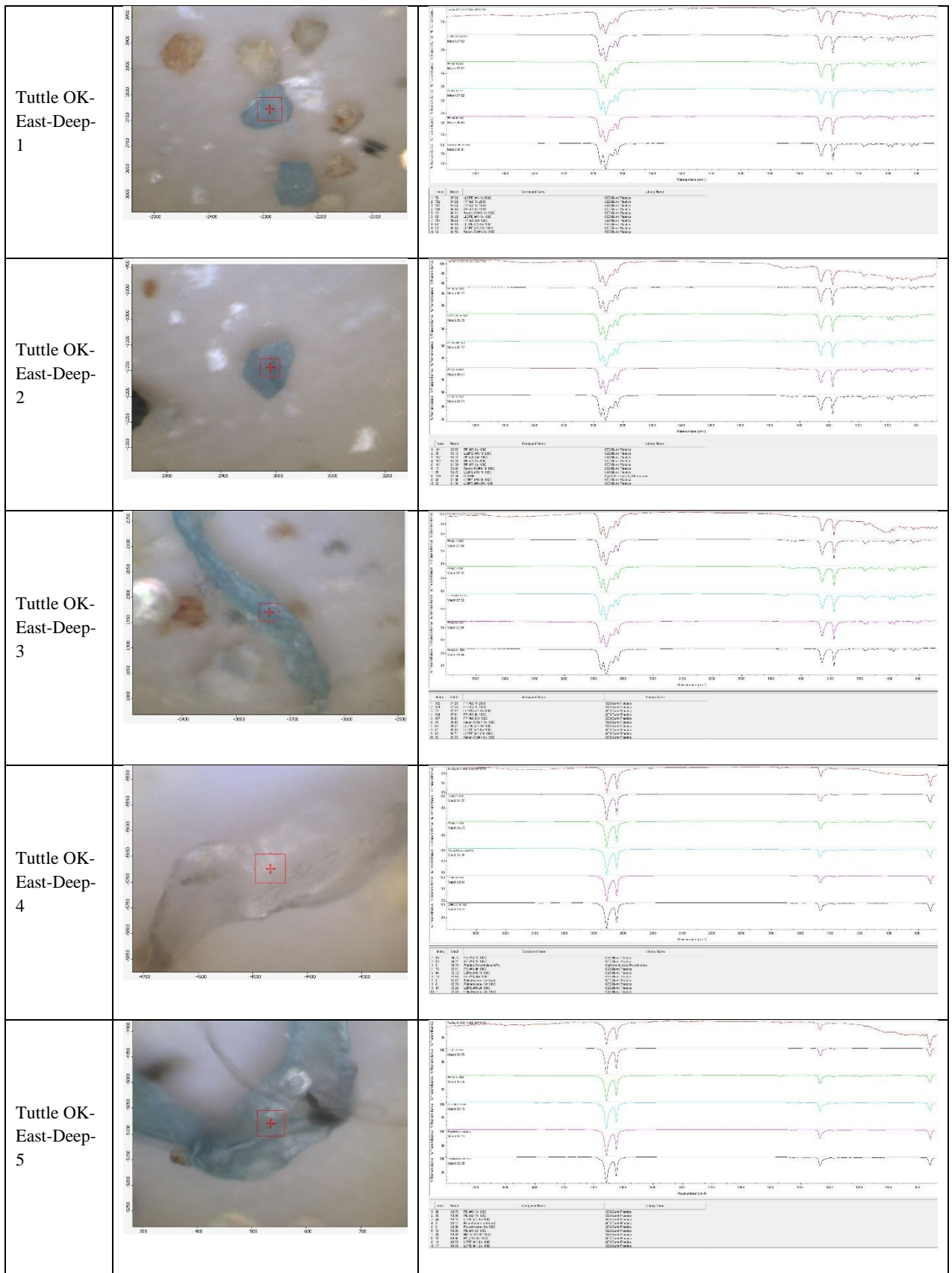


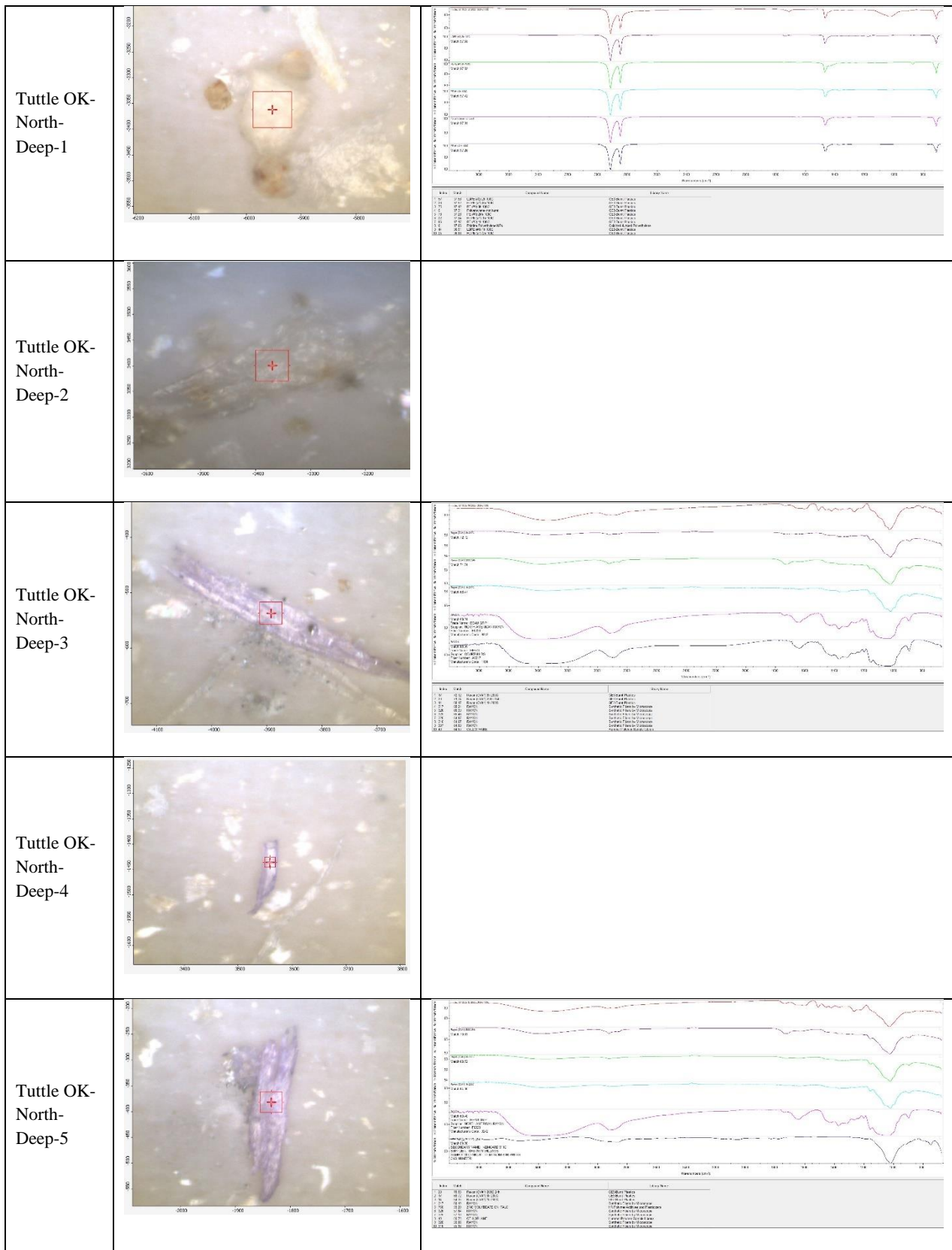






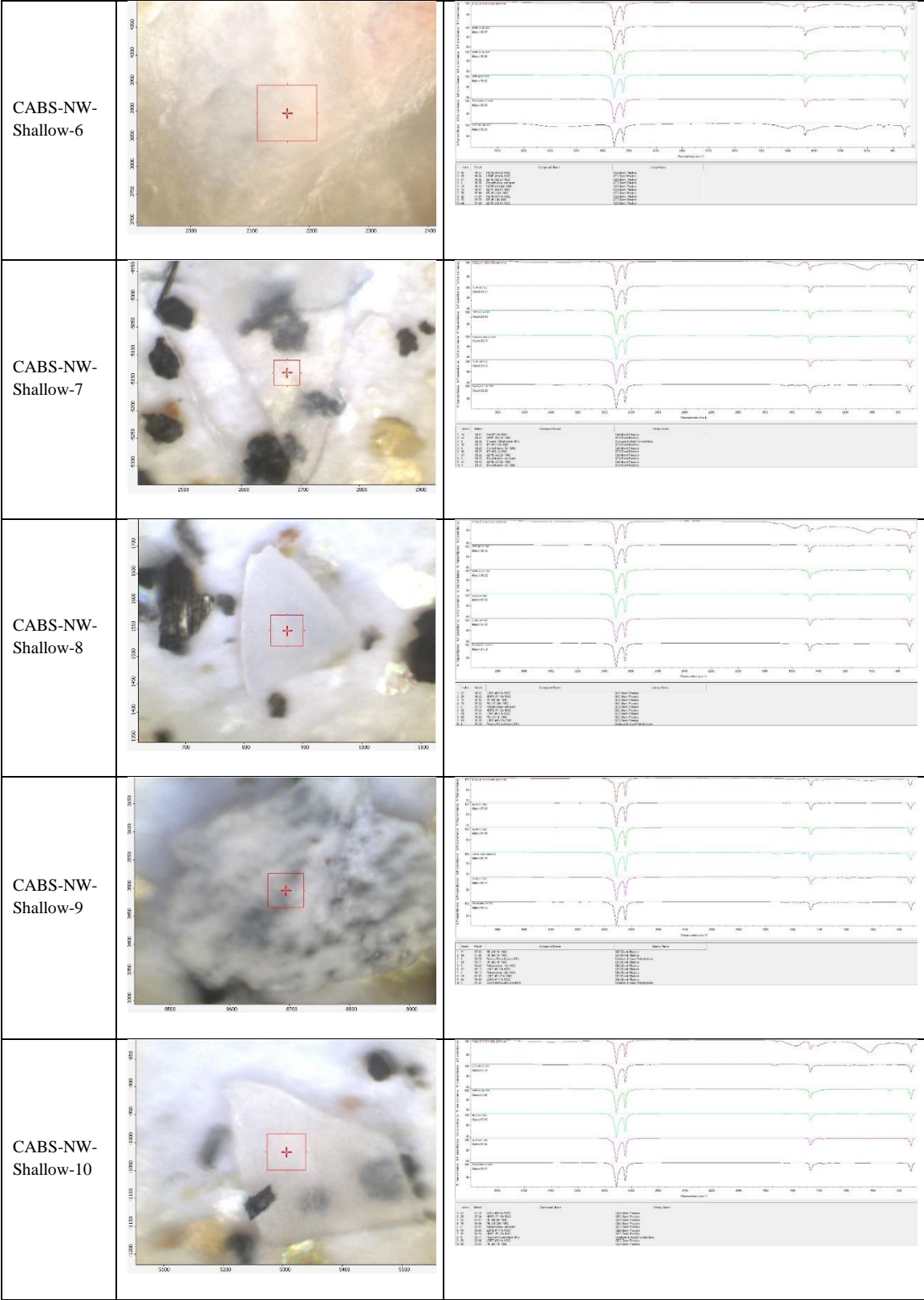


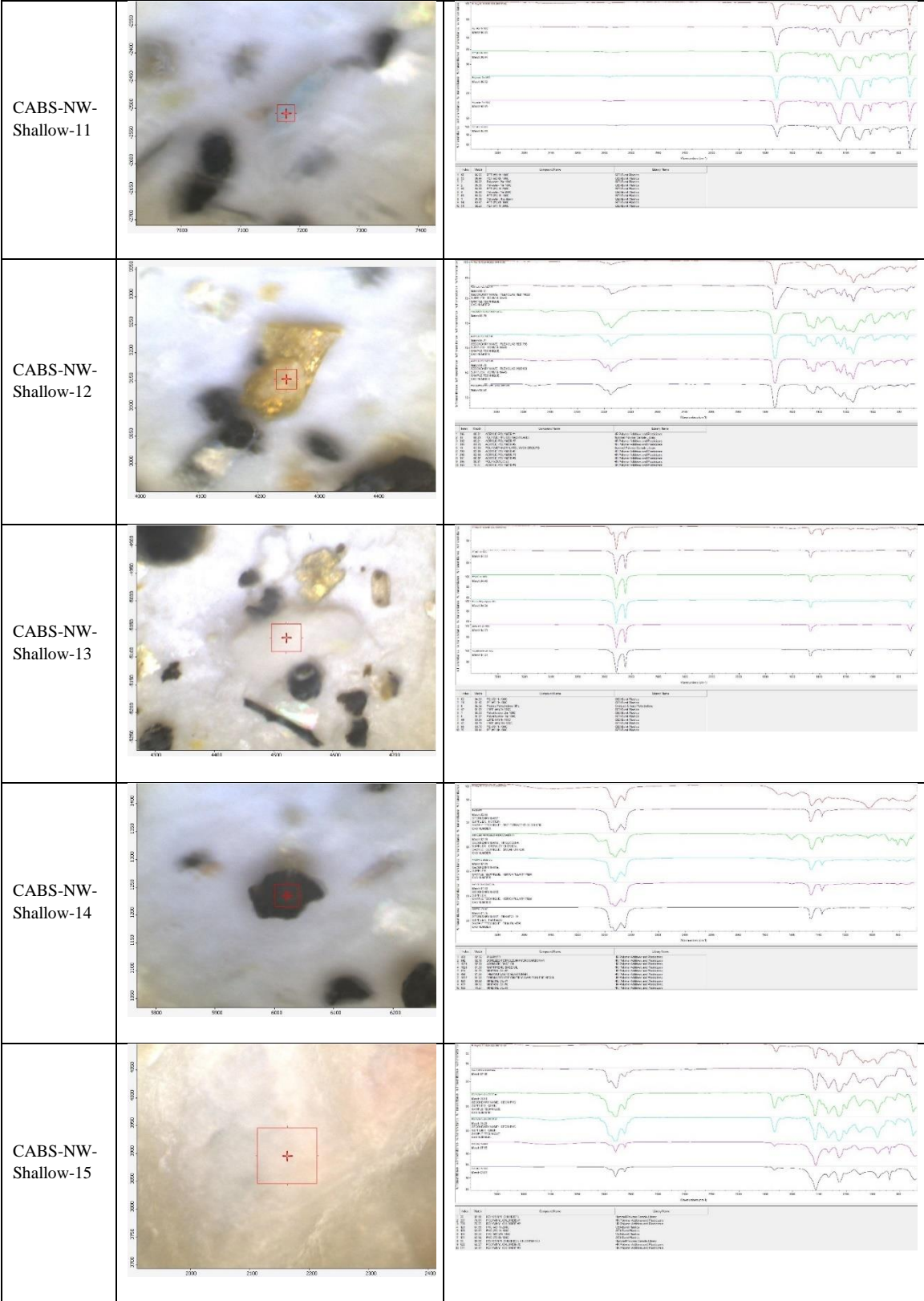


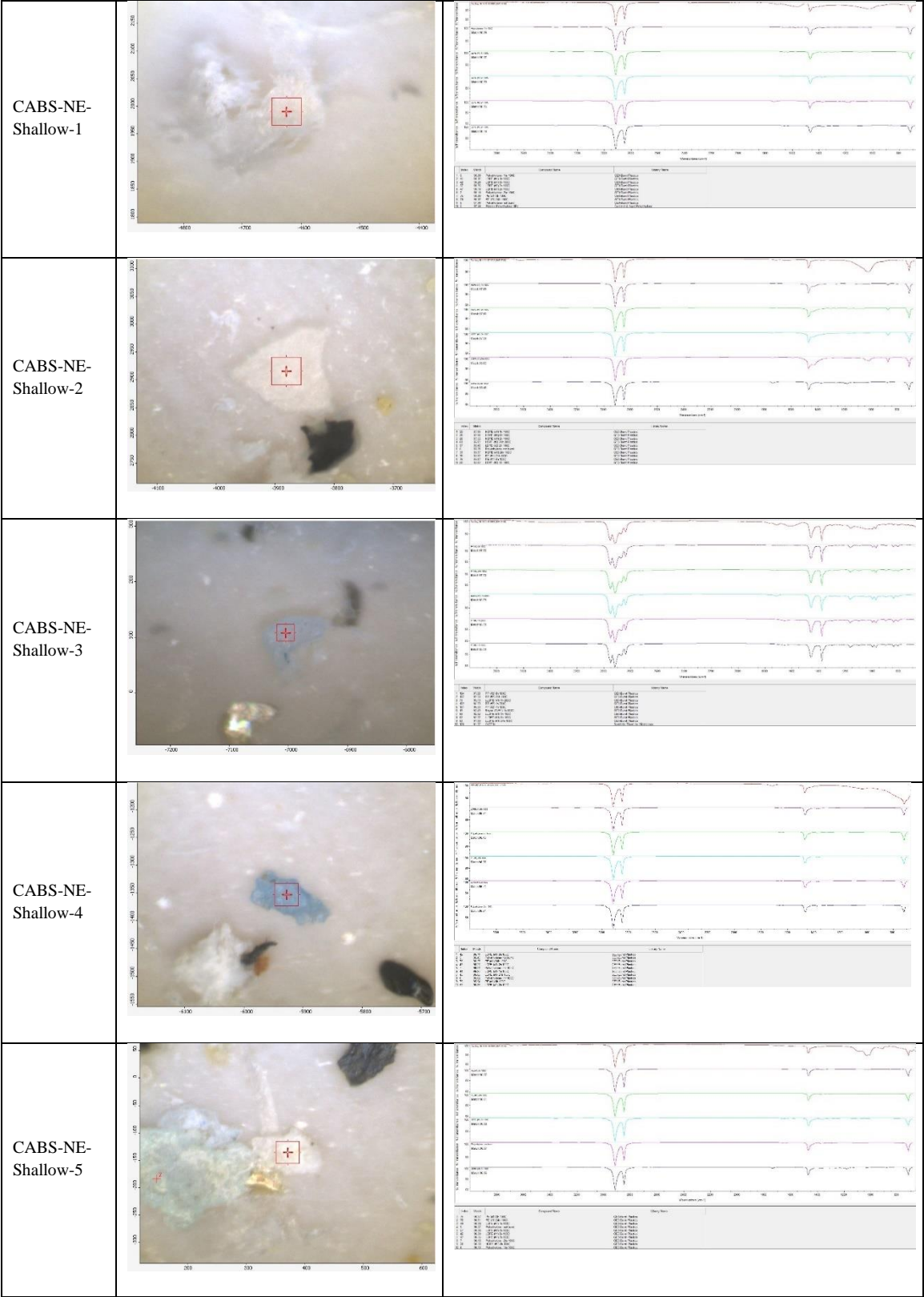


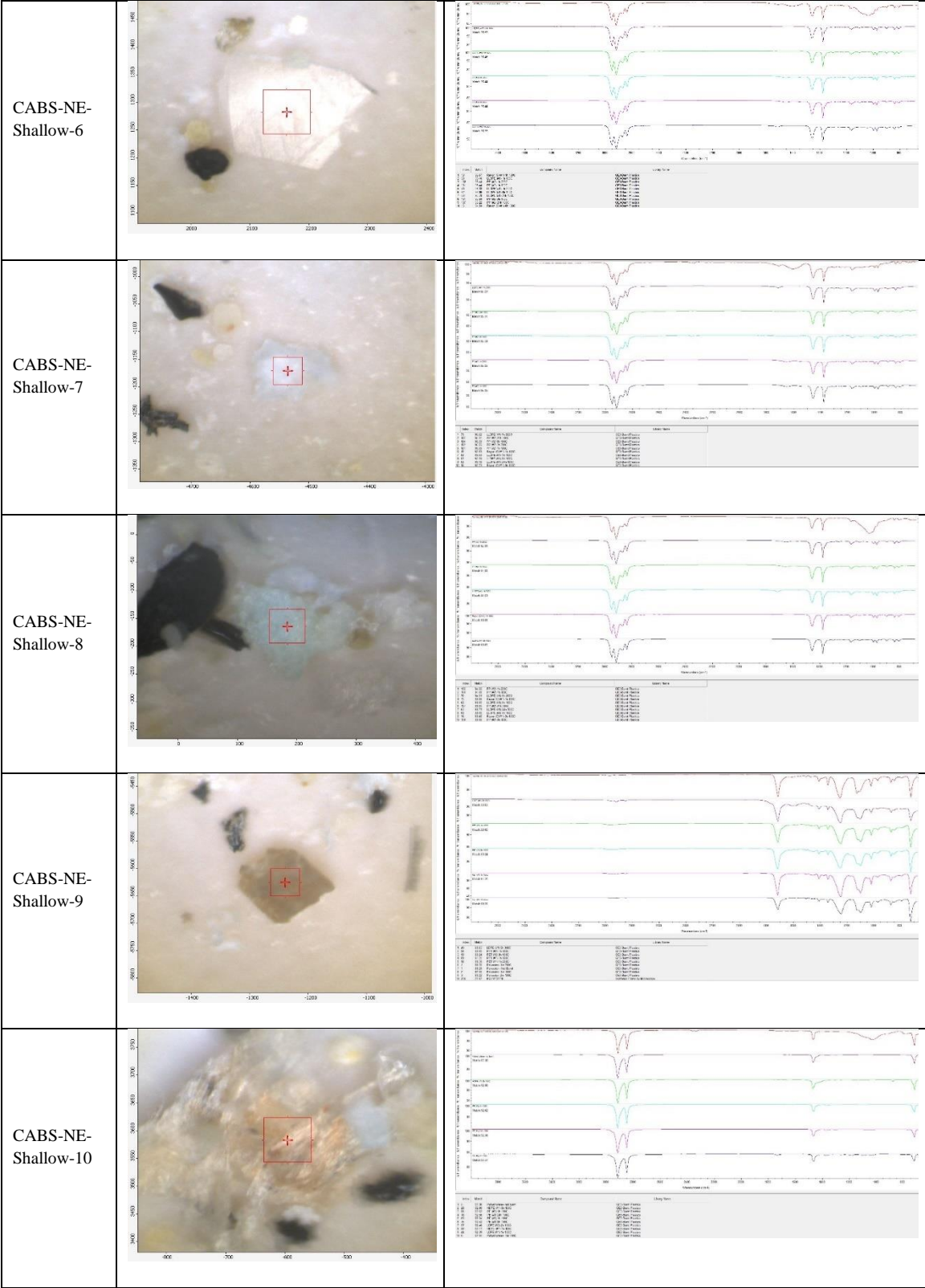
**Table S18: Crow Agency Burn Site ATR-FTIR Particle and Spectra Images**

<p>CABS-NW- Shallow-1</p>		<table border="1"> <thead> <tr> <th>Peak</th> <th>Wavenumber (cm⁻¹)</th> <th>Assignment</th> <th>Library Name</th> </tr> </thead> <tbody> <tr><td>1</td><td>3400</td><td>O-H stretch</td><td>Water</td></tr> <tr><td>2</td><td>2900</td><td>C-H stretch</td><td>Alkanes</td></tr> <tr><td>3</td><td>1700</td><td>C=O stretch</td><td>Carbonyl Compounds</td></tr> <tr><td>4</td><td>1600</td><td>Aromatic C=C</td><td>Aromatic Compounds</td></tr> <tr><td>5</td><td>1500</td><td>C=C stretch</td><td>Alkenes</td></tr> <tr><td>6</td><td>1450</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>7</td><td>1400</td><td>C=C stretch</td><td>Alkenes</td></tr> <tr><td>8</td><td>1380</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>9</td><td>1300</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>10</td><td>1250</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>11</td><td>1100</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>12</td><td>1050</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>13</td><td>1000</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>14</td><td>950</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>15</td><td>900</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>16</td><td>850</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>17</td><td>800</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>18</td><td>750</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>19</td><td>700</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>20</td><td>650</td><td>C-O stretch</td><td>Ethers</td></tr> <tr><td>21</td><td>600</td><td>C-O stretch</td><td>Ethers</td></tr> </tbody> </table>	Peak	Wavenumber (cm⁻¹)	Assignment	Library Name	1	3400	O-H stretch	Water	2	2900	C-H stretch	Alkanes	3	1700	C=O stretch	Carbonyl Compounds	4	1600	Aromatic C=C	Aromatic Compounds	5	1500	C=C stretch	Alkenes	6	1450	C-O stretch	Ethers	7	1400	C=C stretch	Alkenes	8	1380	C-O stretch	Ethers	9	1300	C-O stretch	Ethers	10	1250	C-O stretch	Ethers	11	1100	C-O stretch	Ethers	12	1050	C-O stretch	Ethers	13	1000	C-O stretch	Ethers	14	950	C-O stretch	Ethers	15	900	C-O stretch	Ethers	16	850	C-O stretch	Ethers	17	800	C-O stretch	Ethers	18	750	C-O stretch	Ethers	19	700	C-O stretch	Ethers	20	650	C-O stretch	Ethers	21	600	C-O stretch	Ethers
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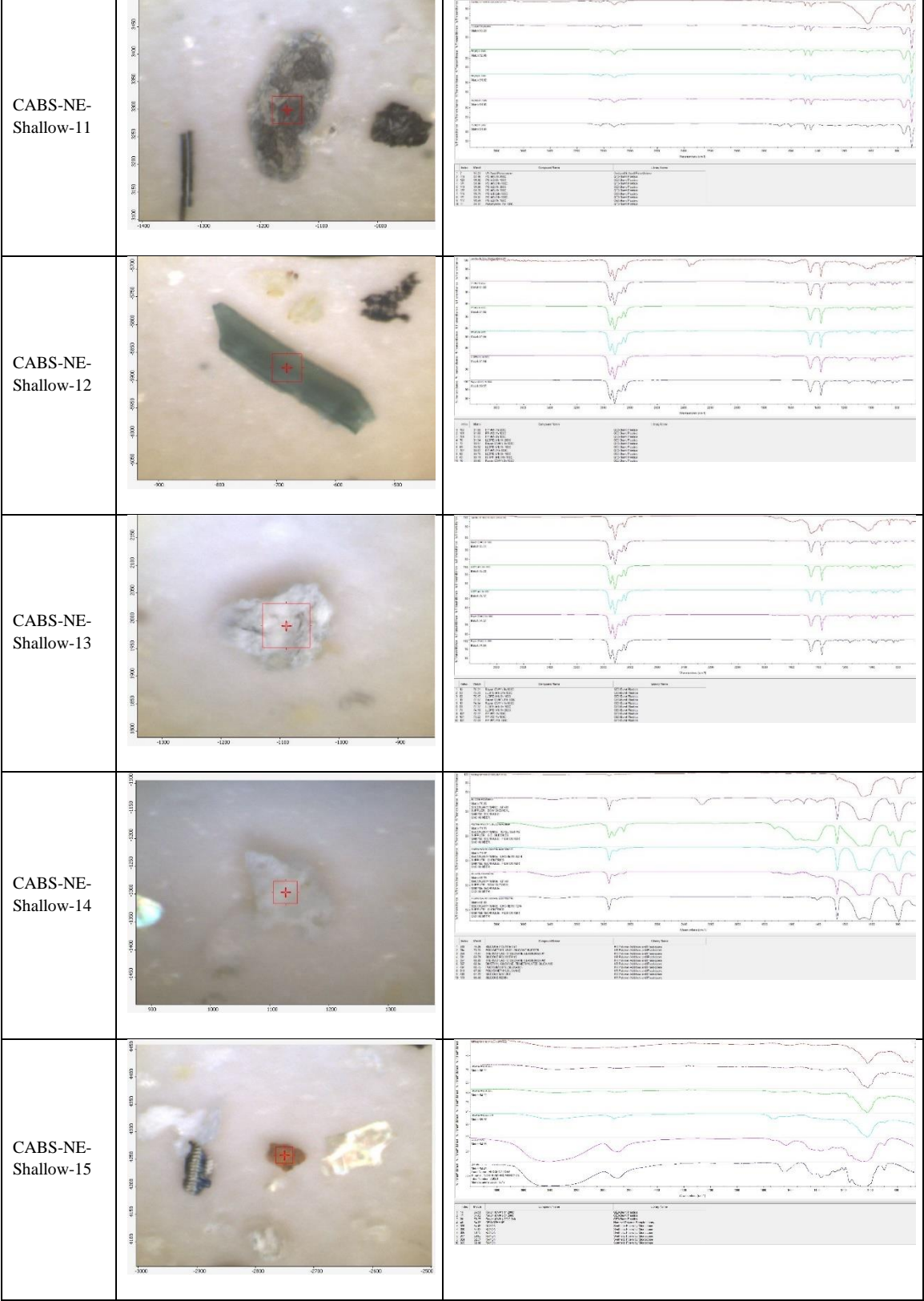


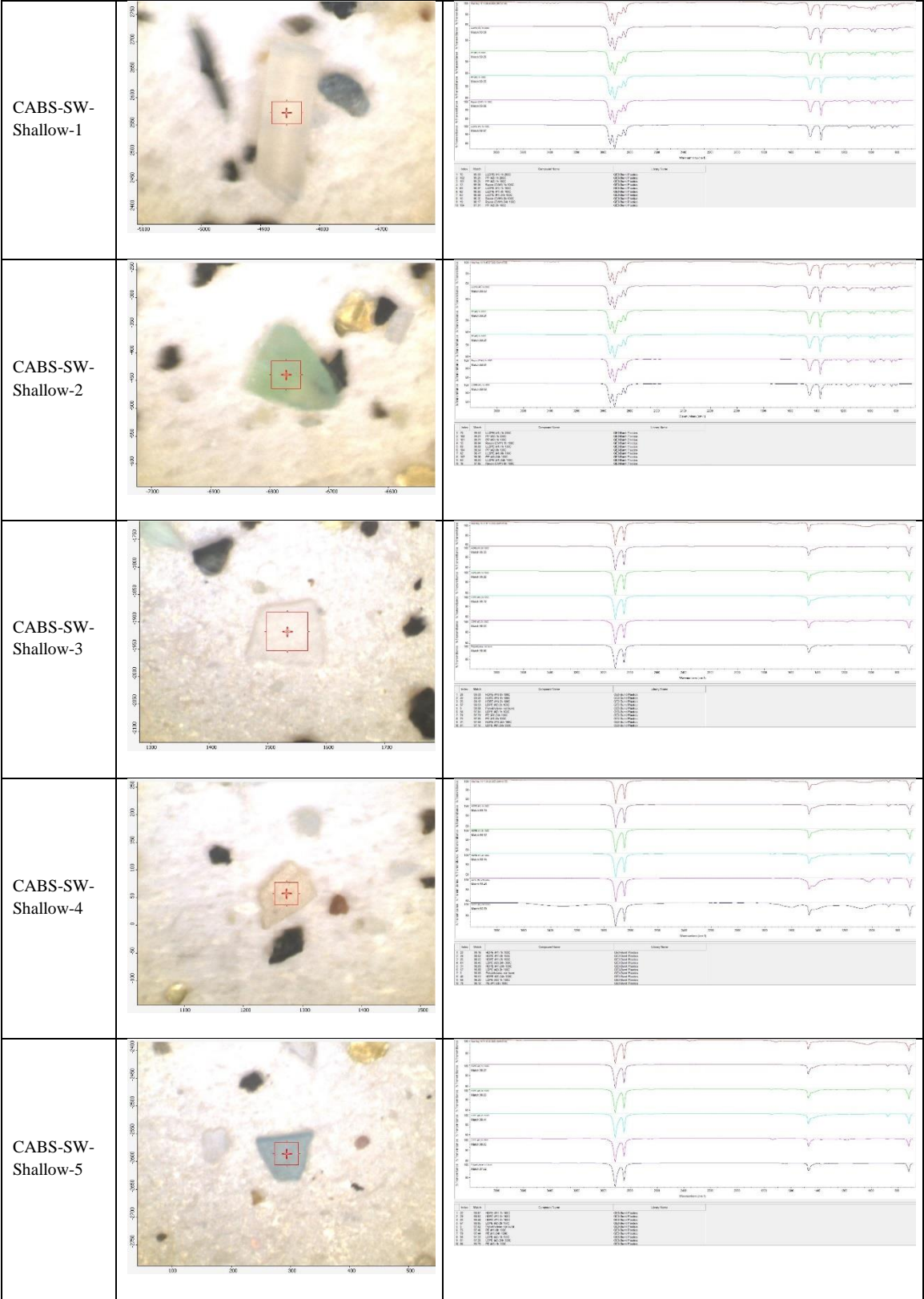


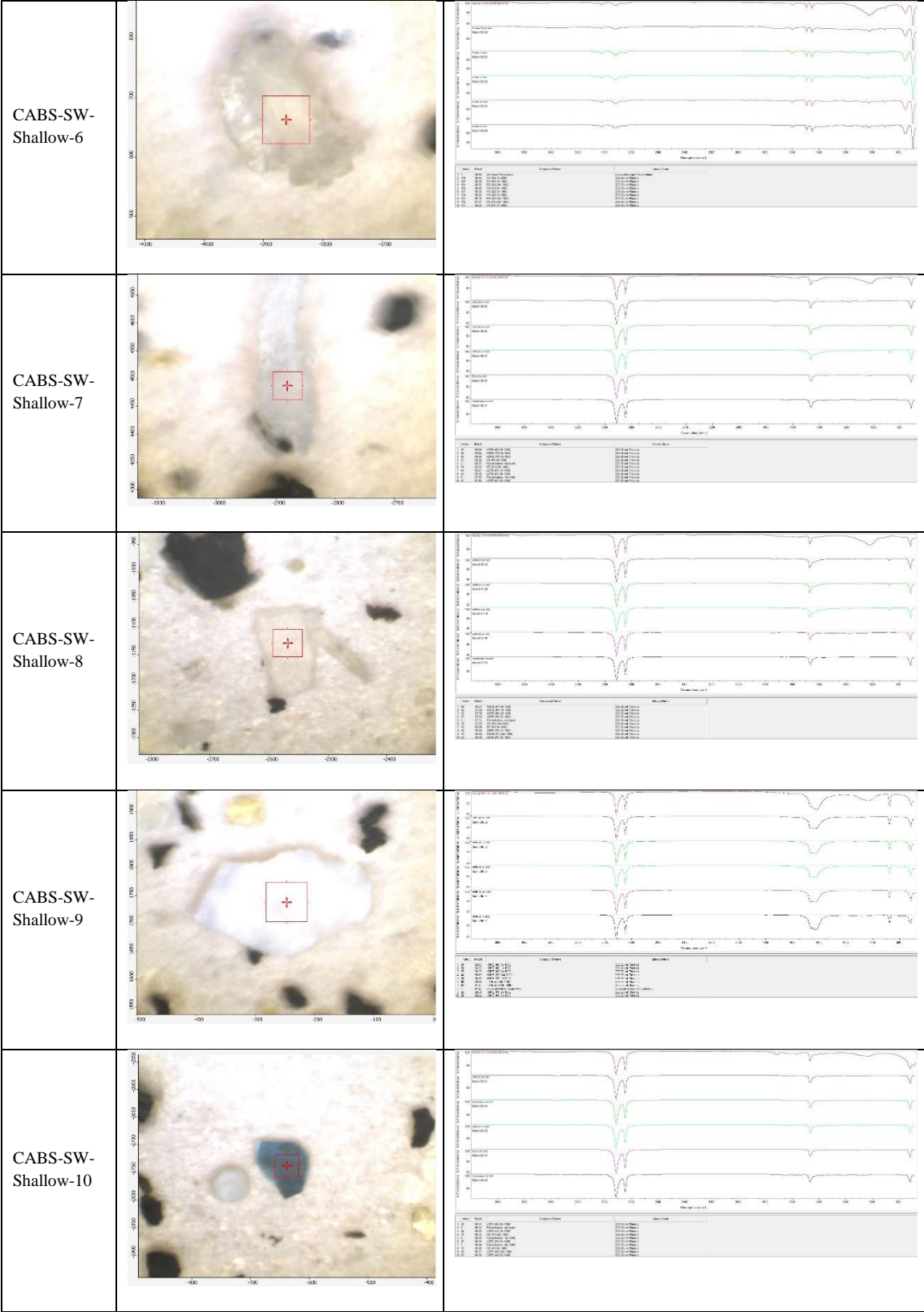


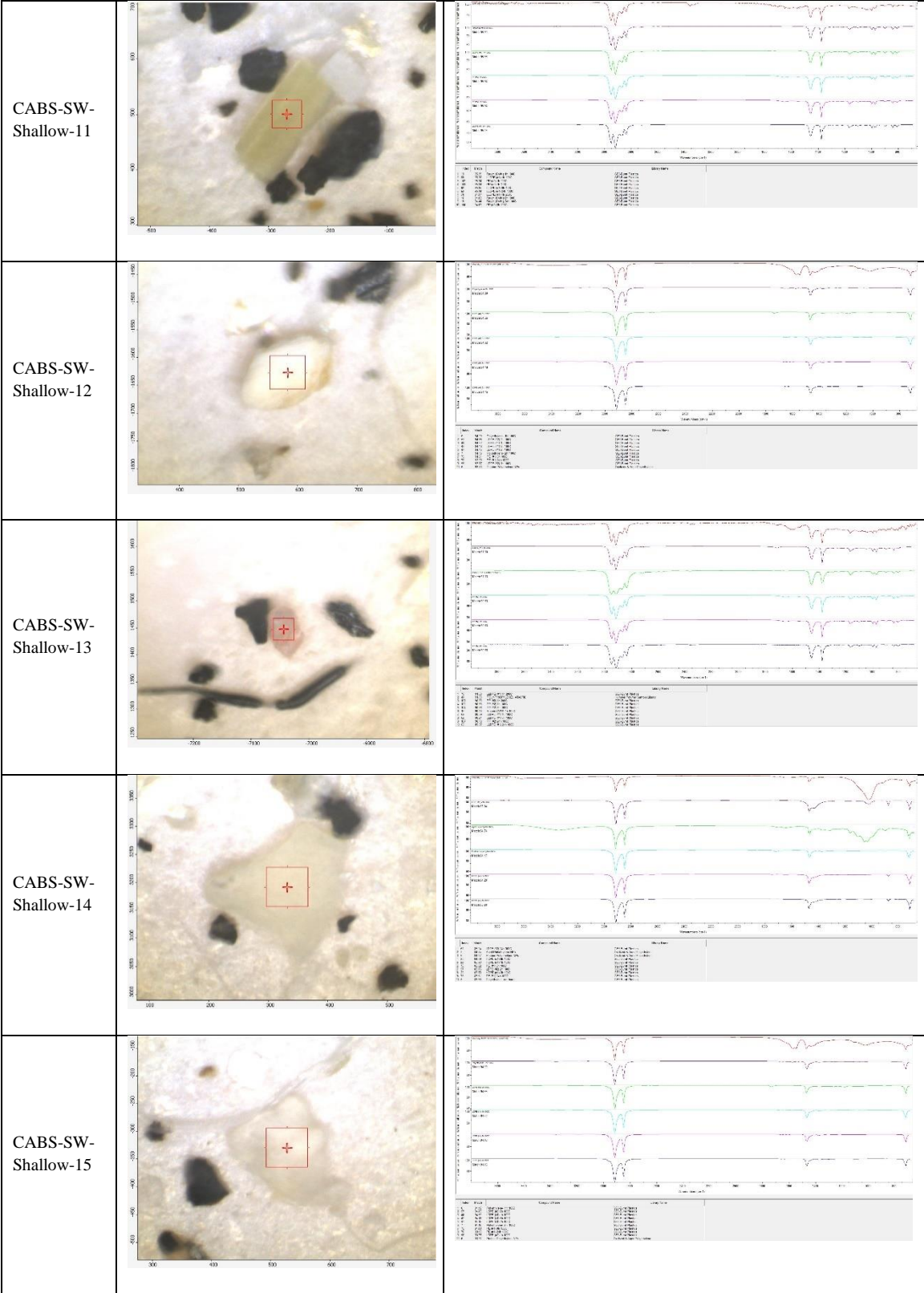




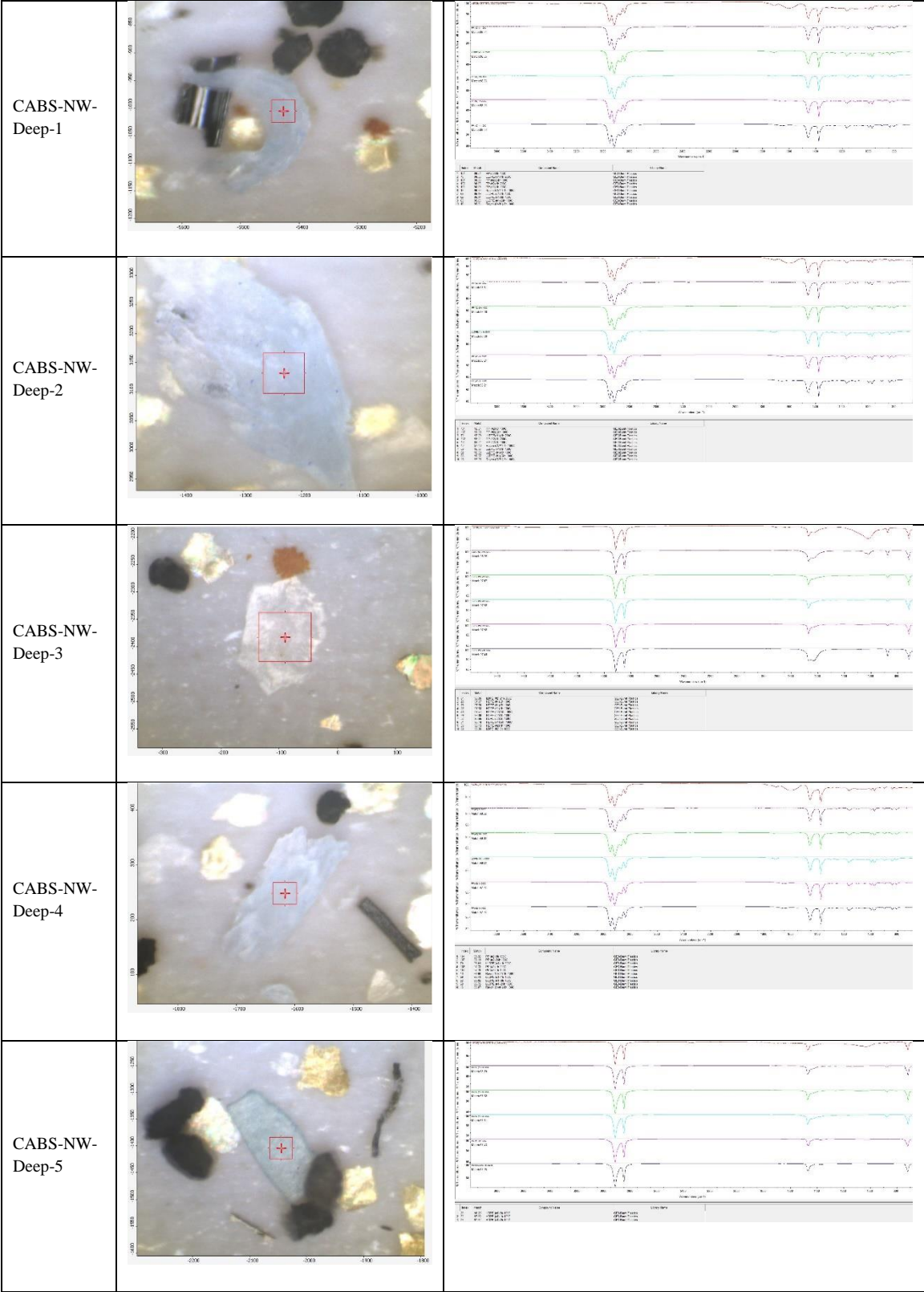


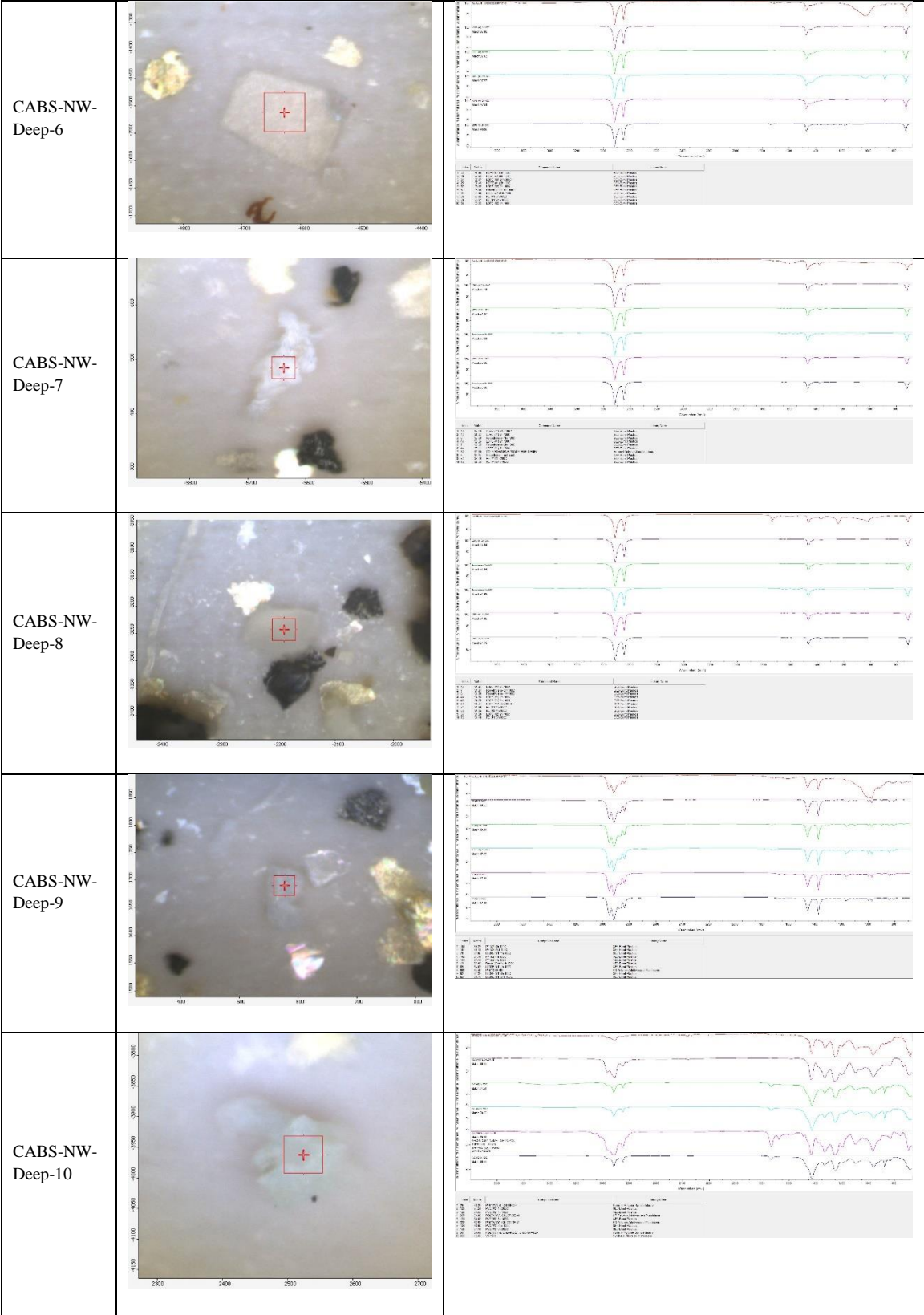


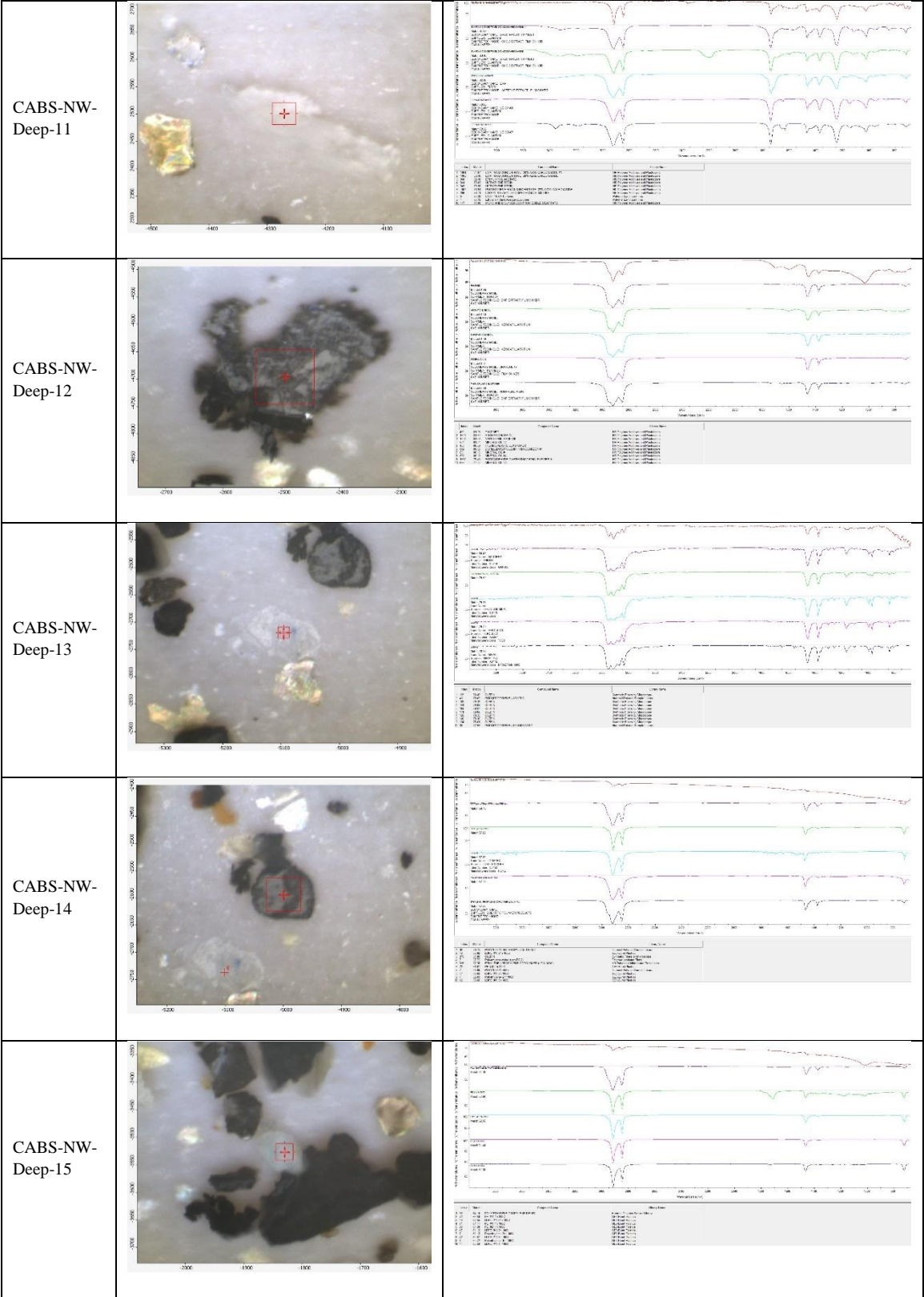




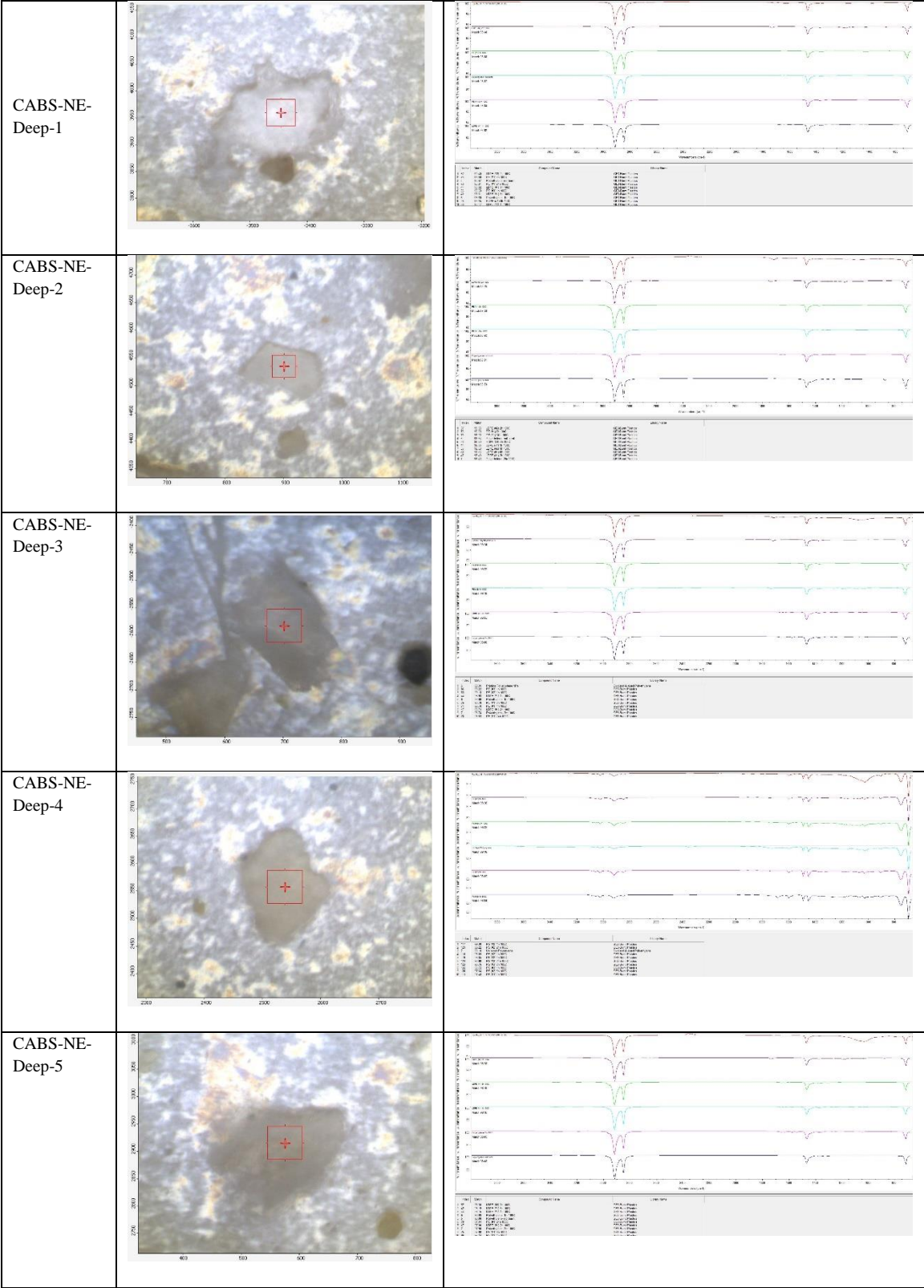
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CABS-SE- Shallow-4	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-5	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-6	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-7	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-8	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-9	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-10	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-11	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-12	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-13	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
CABS-SE- Shallow-14	<b>n/a due to excessive ash</b>	<b>n/a due to excessive ash</b>
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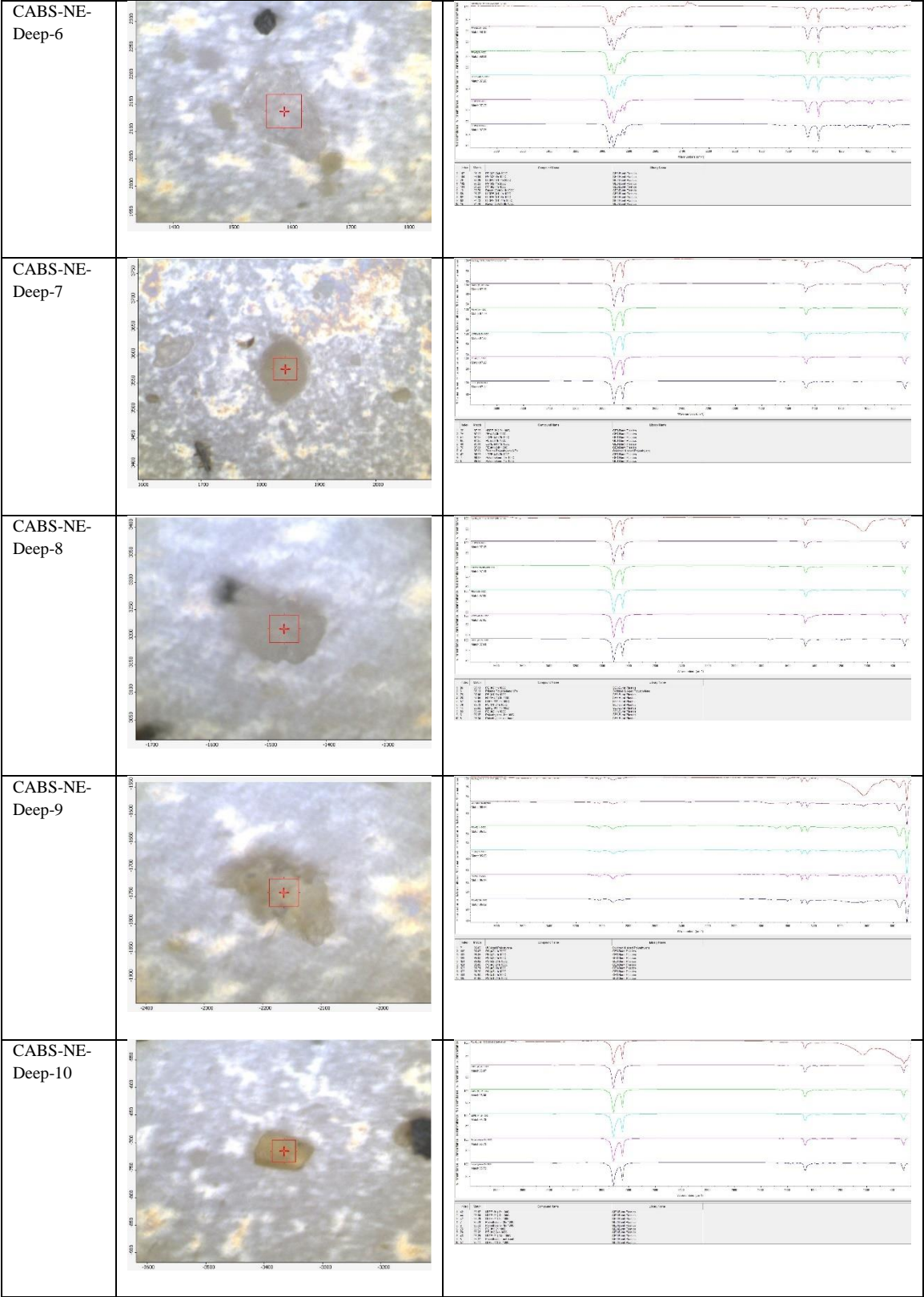


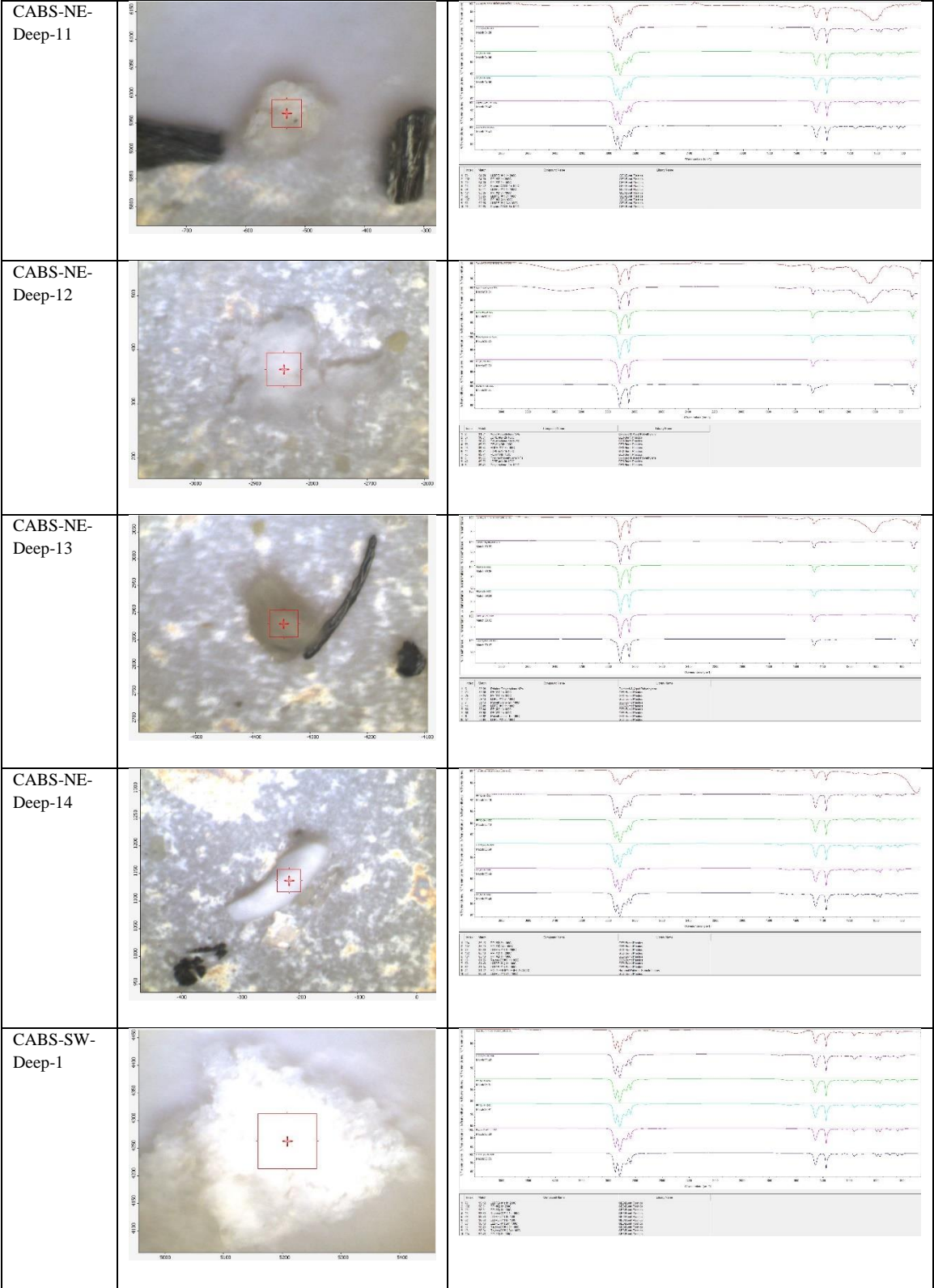


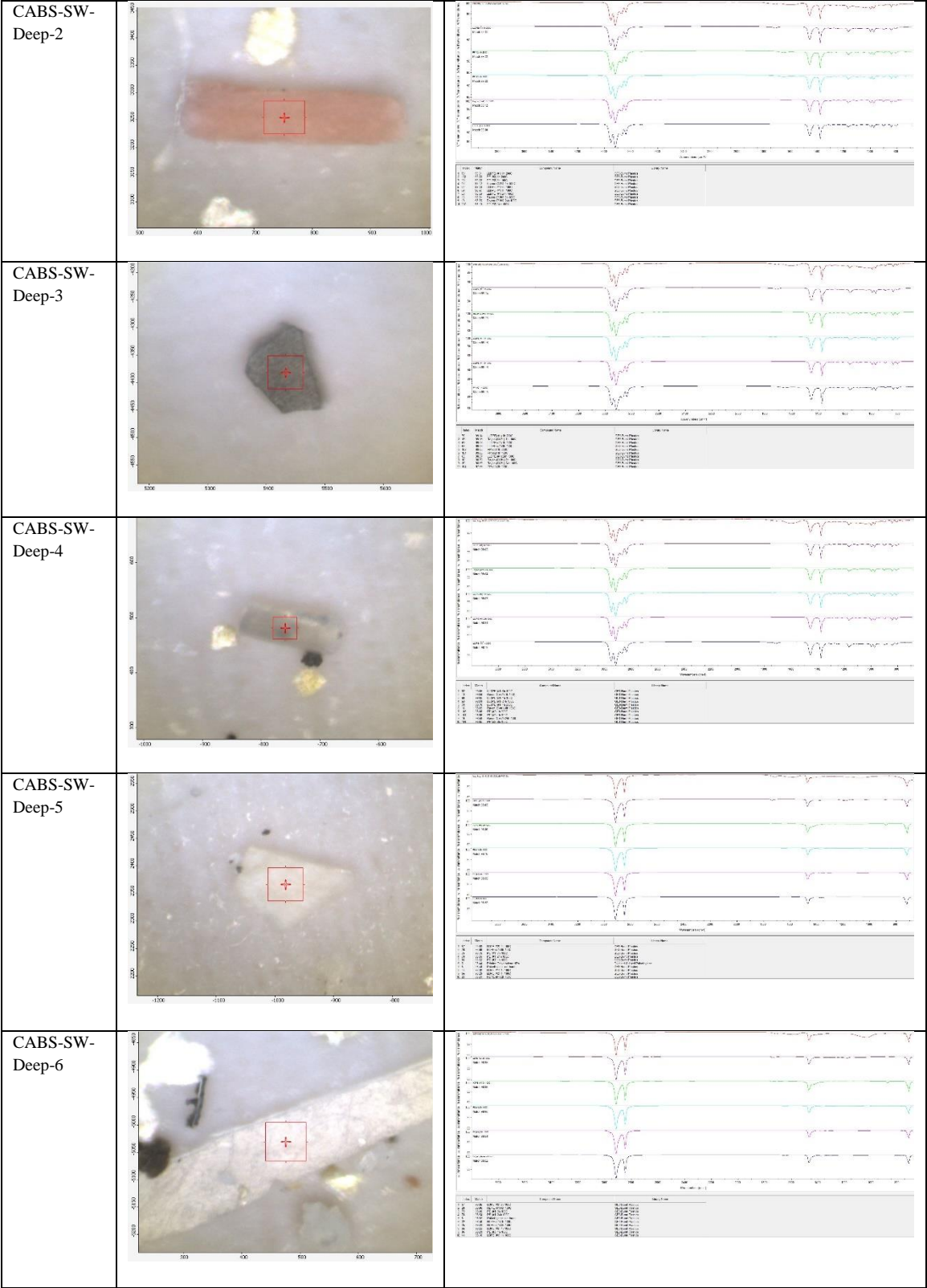


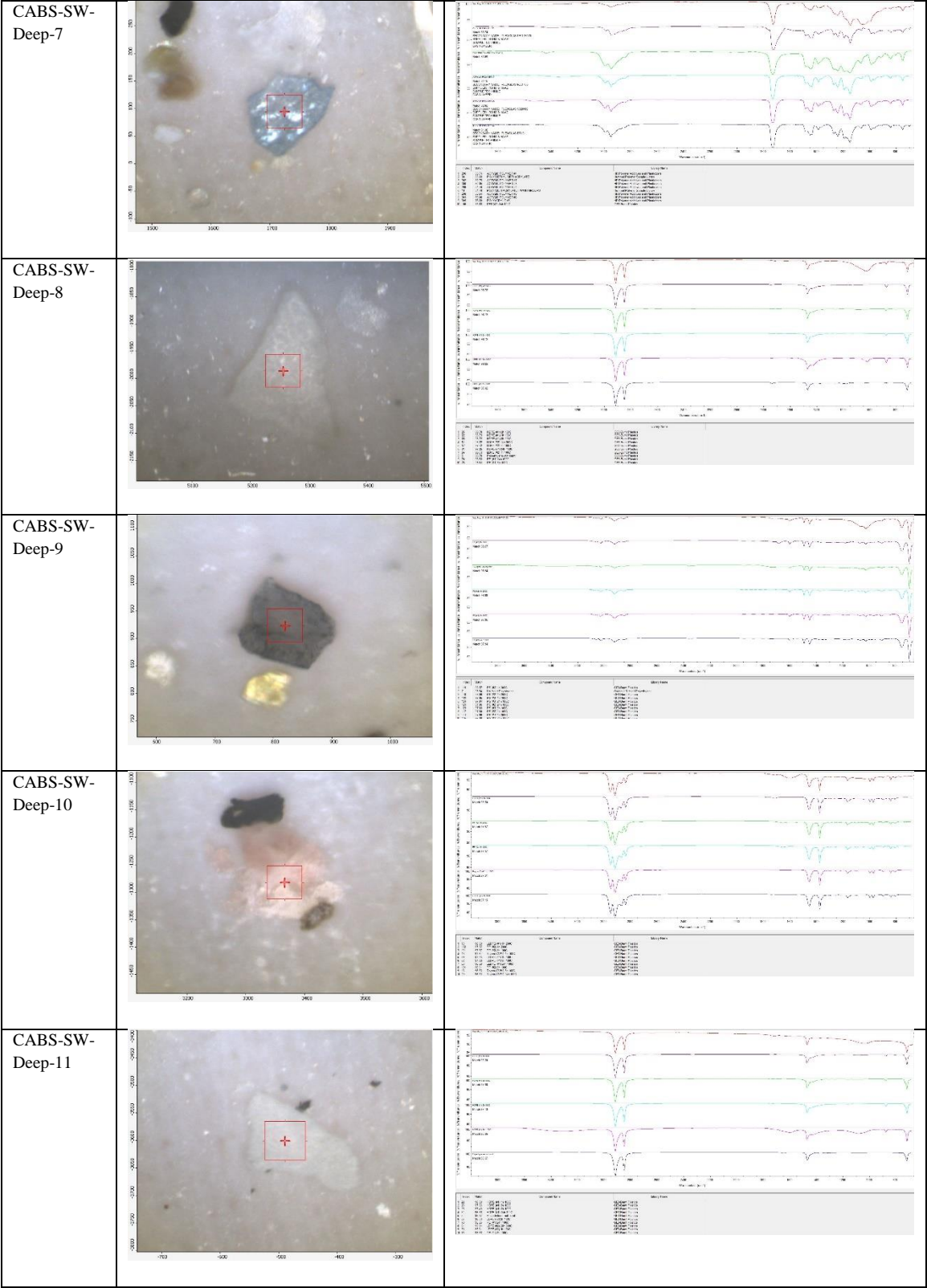


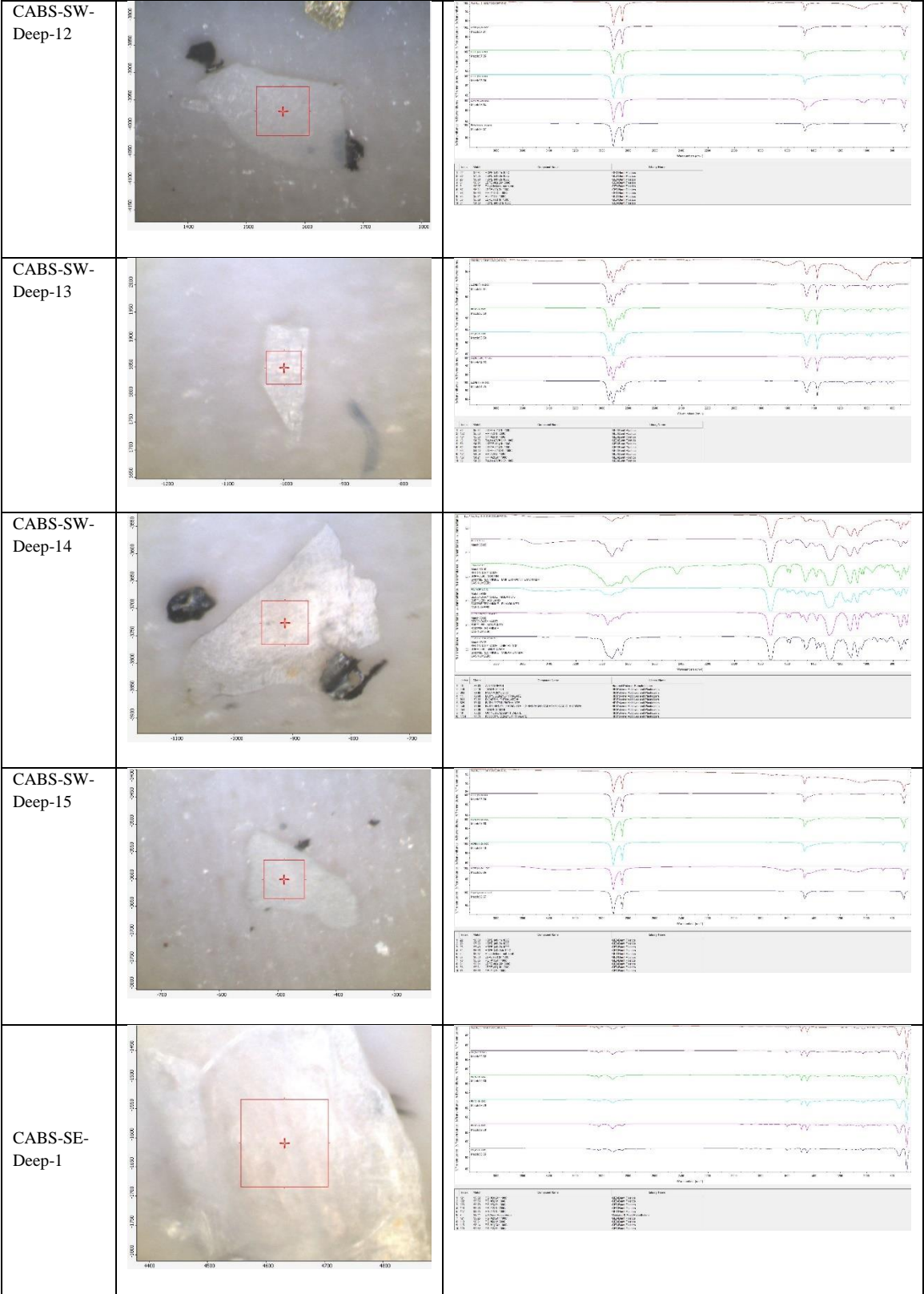


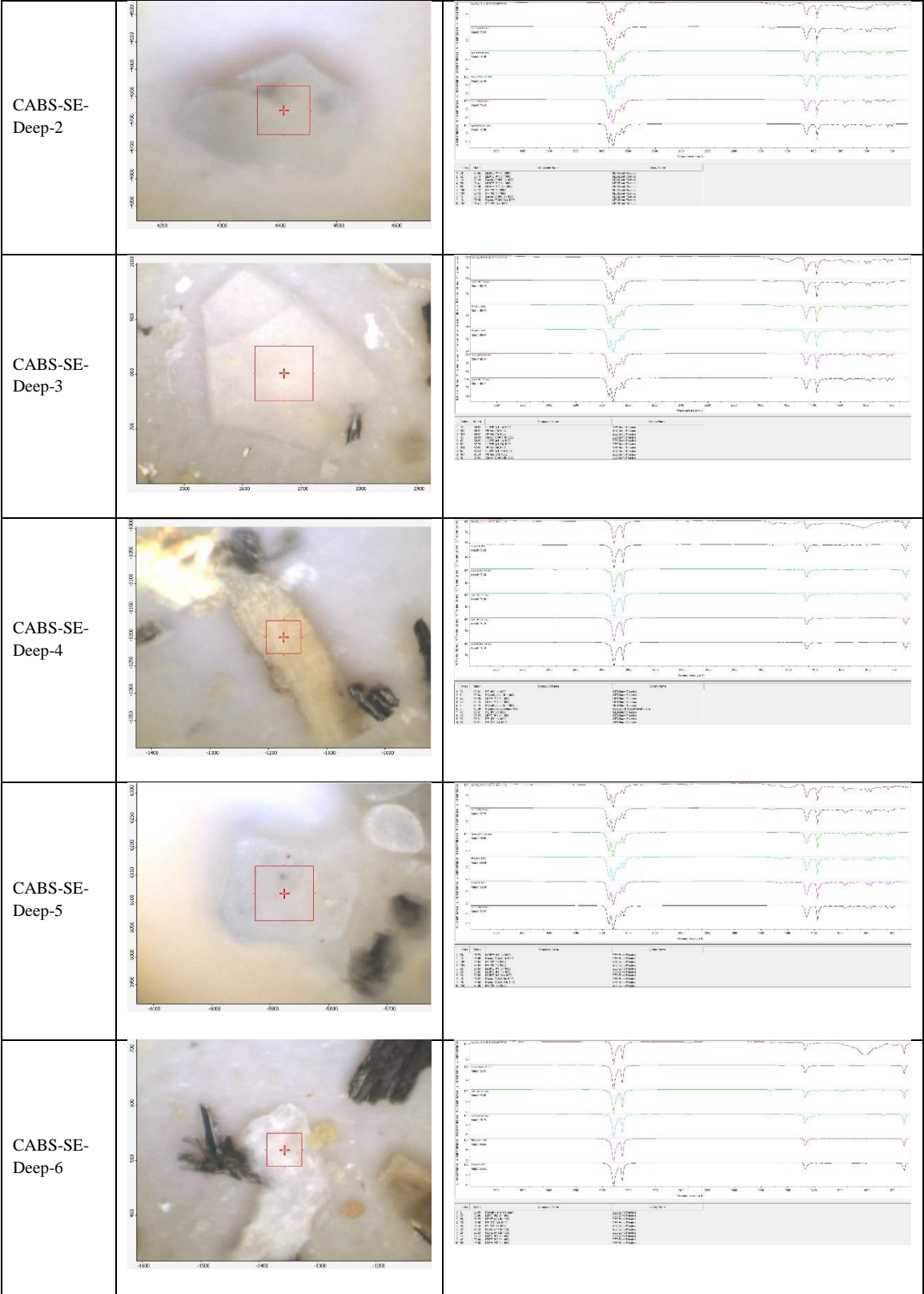


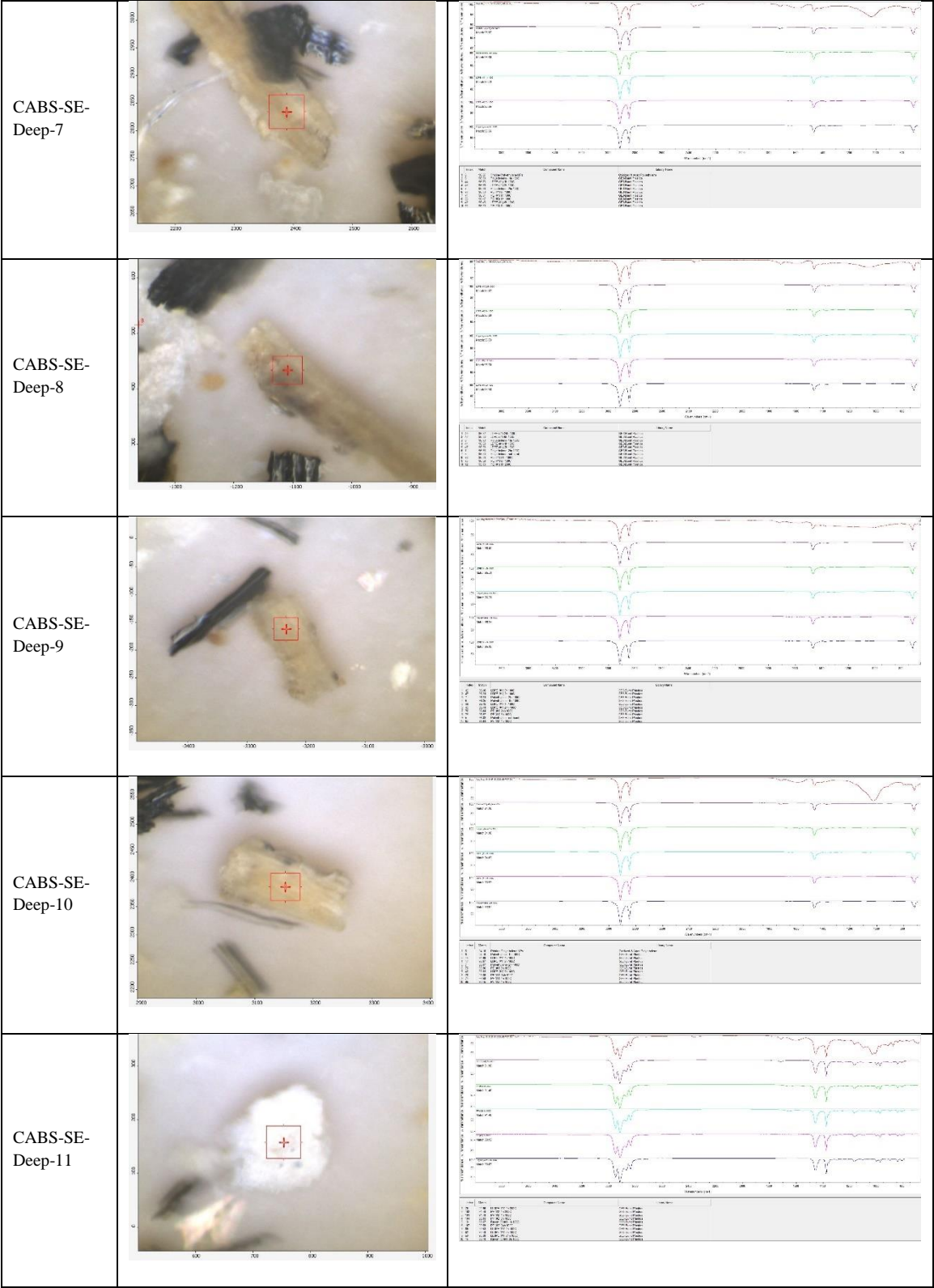




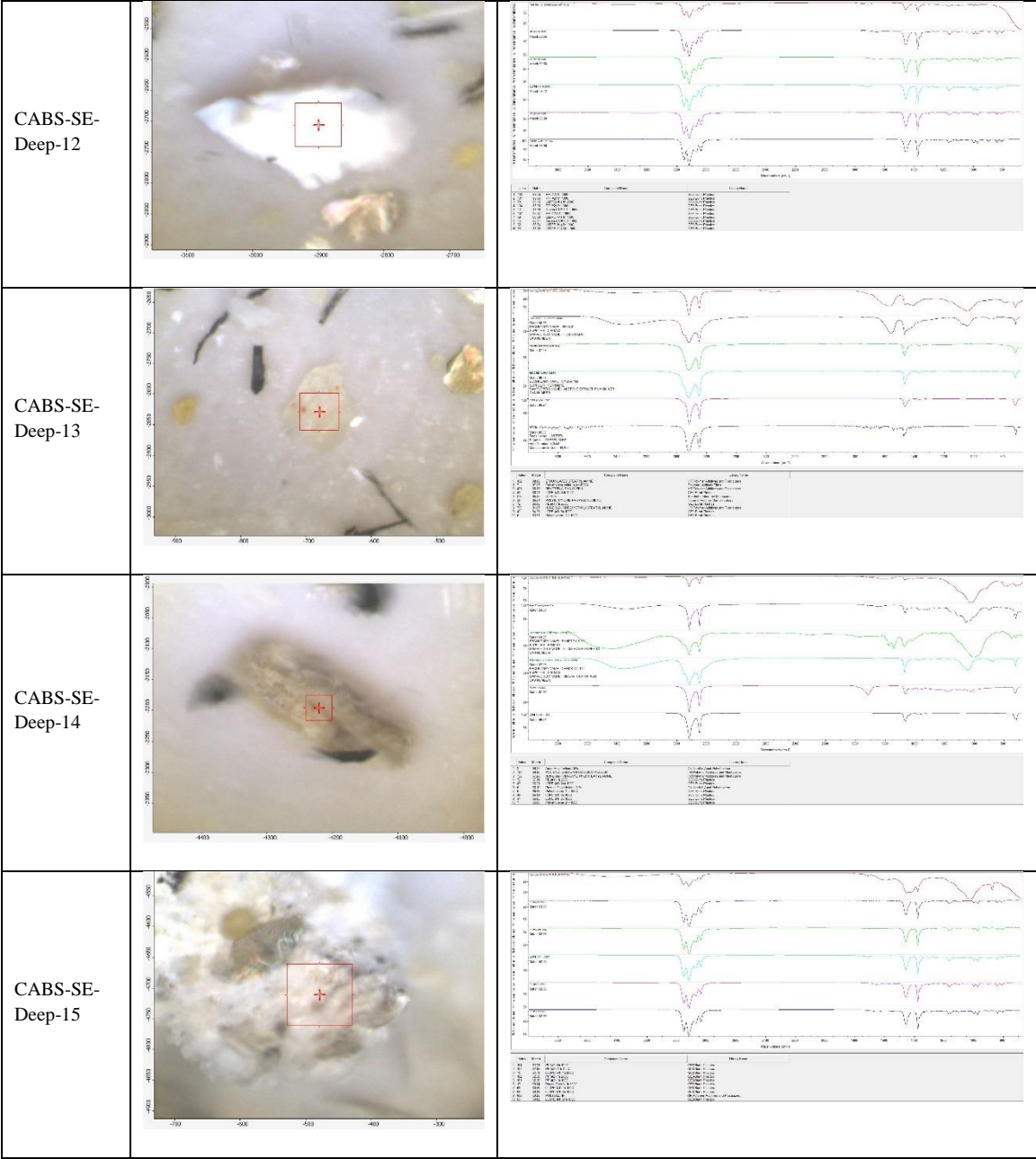




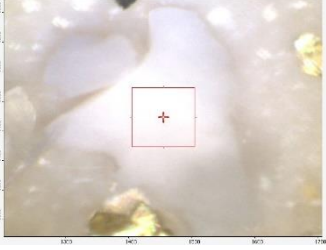
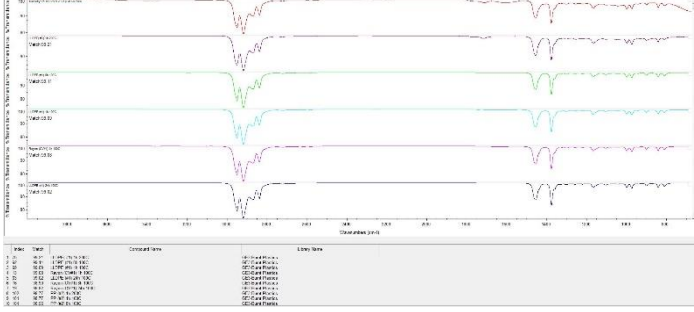

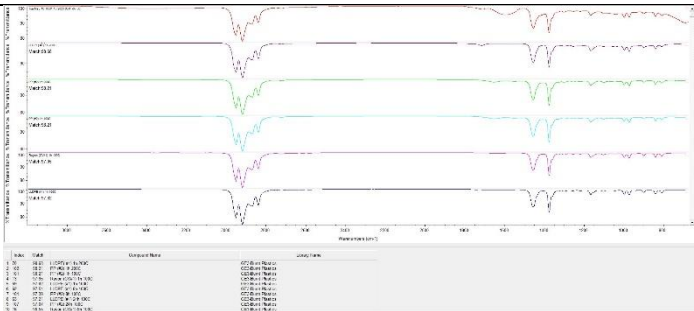
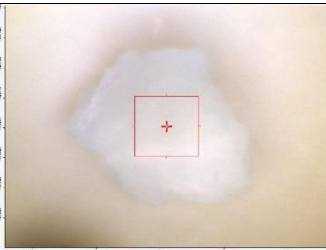
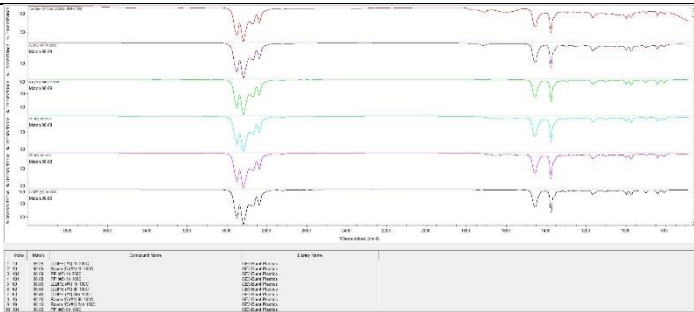
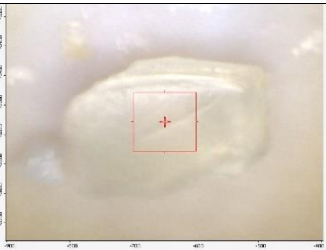
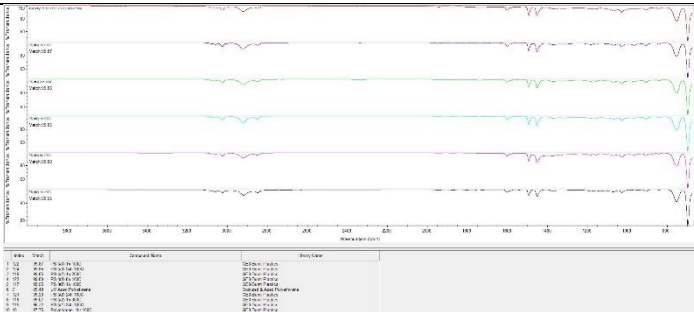


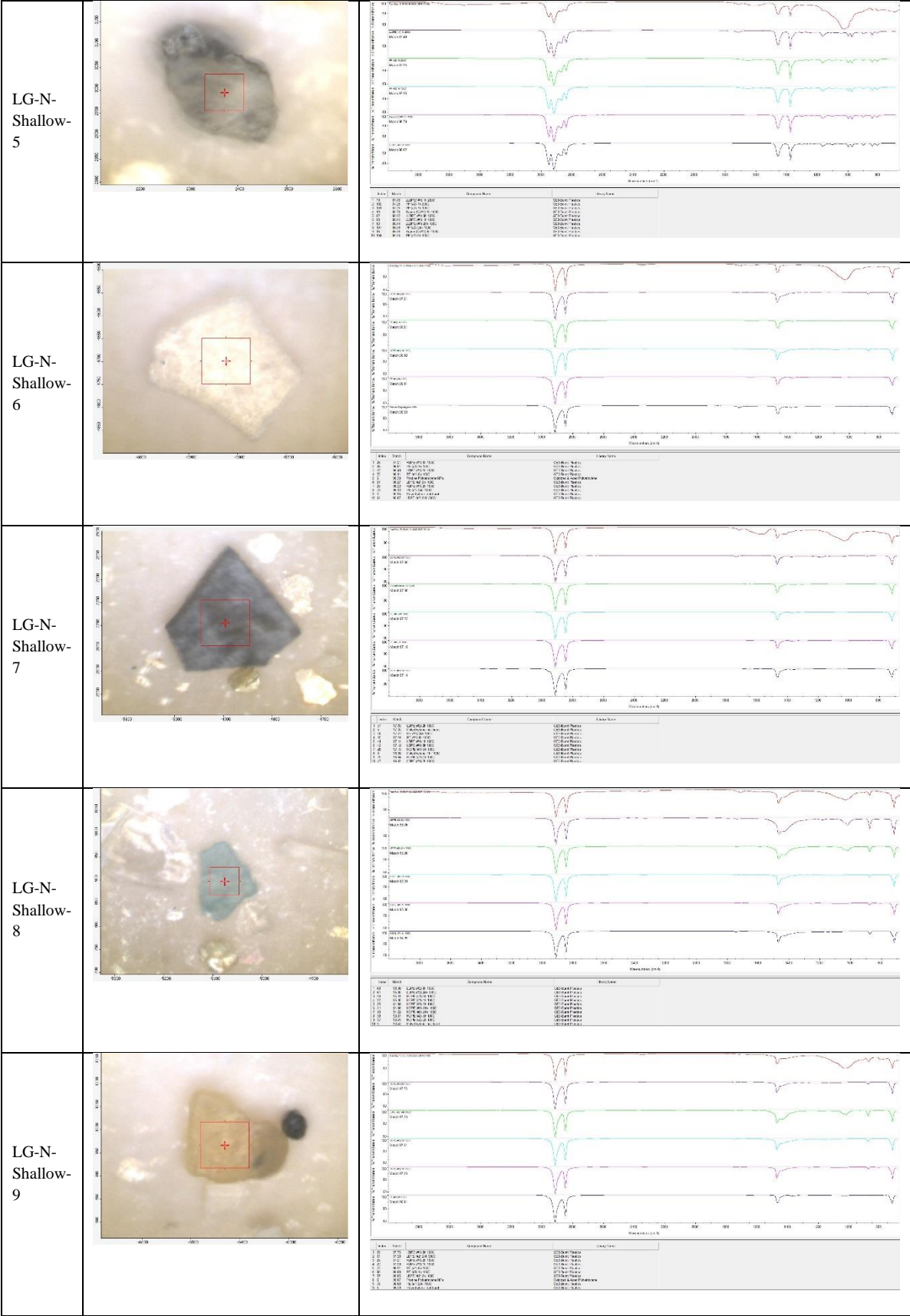


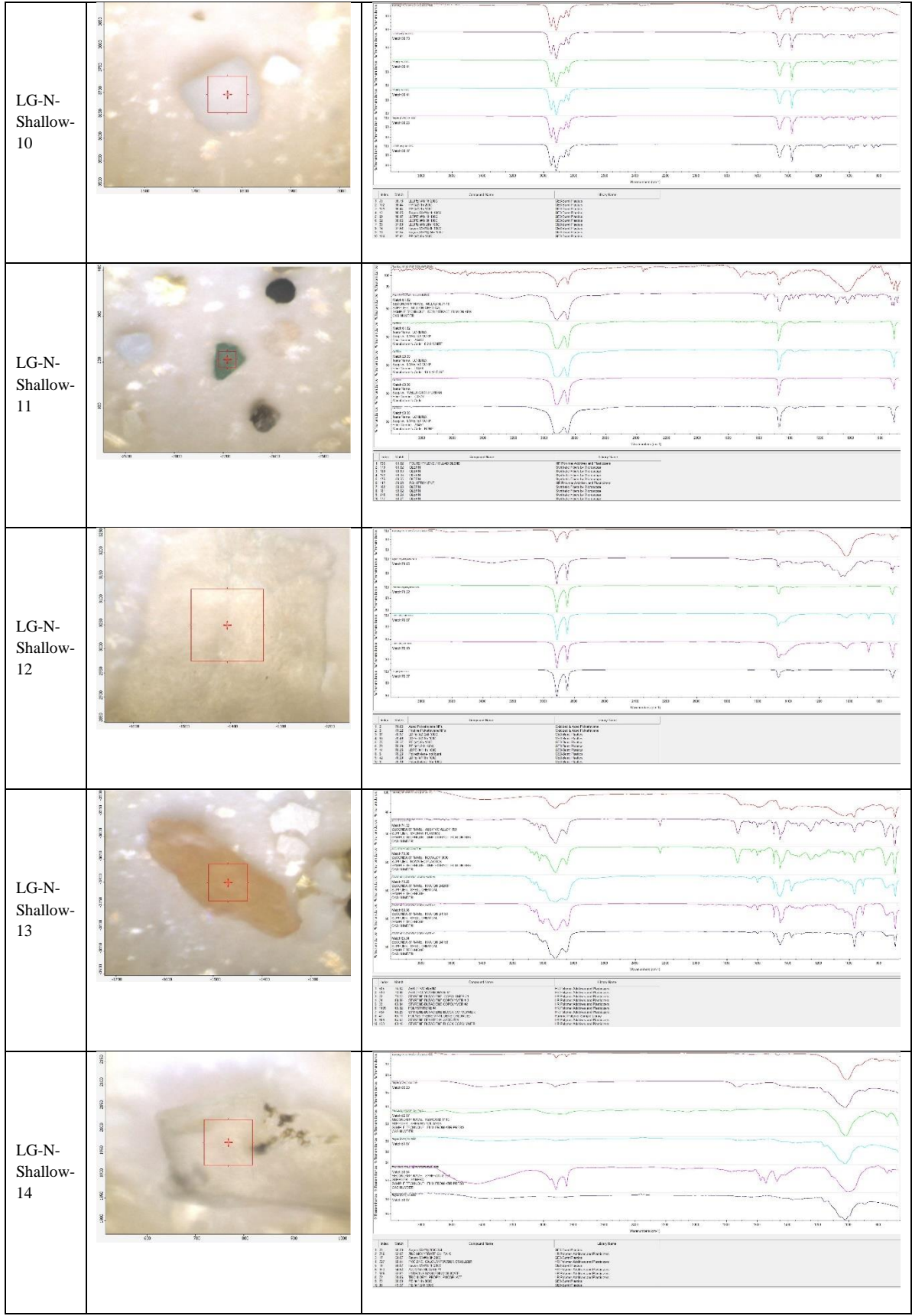


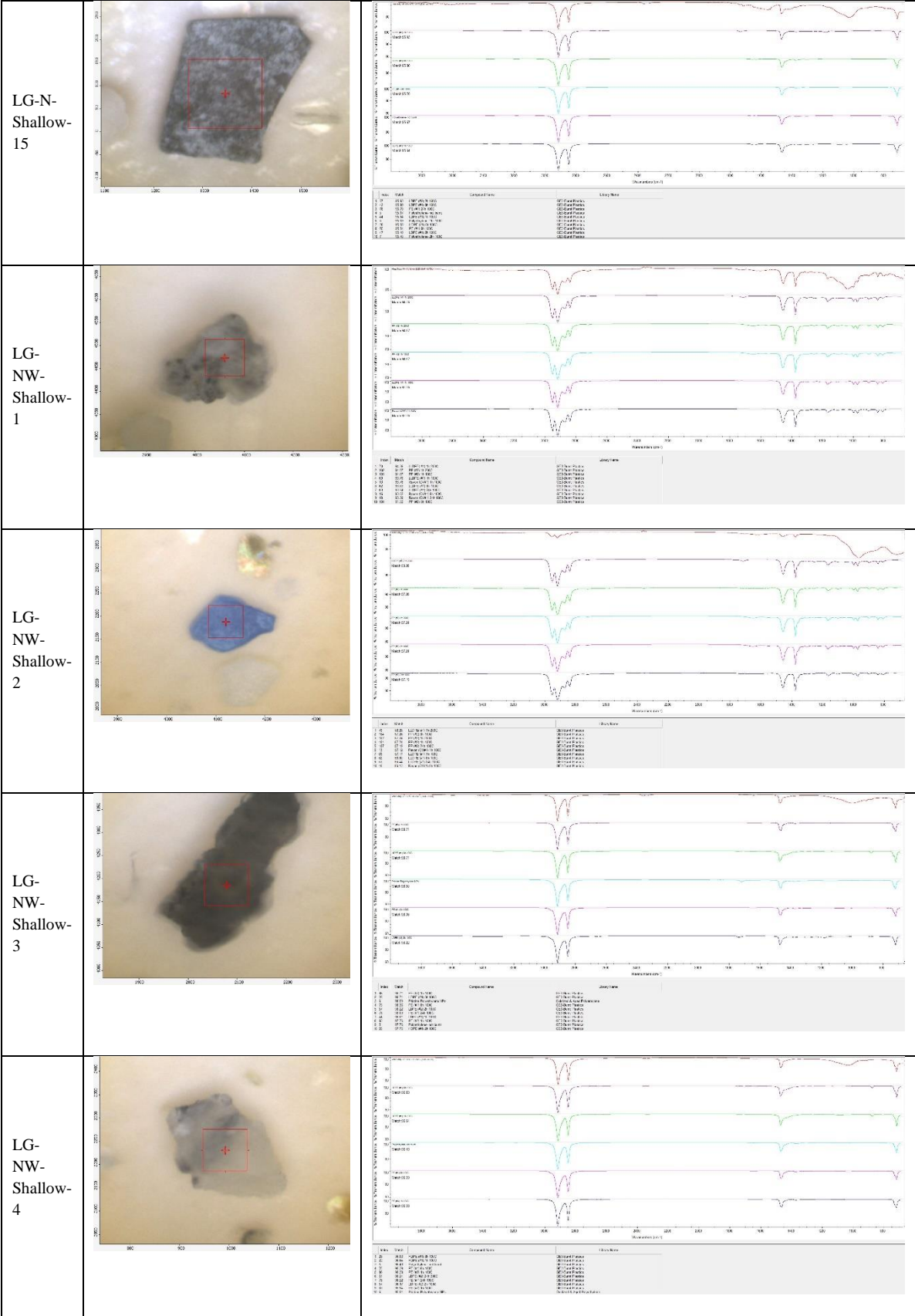


**Table S19: Lodge Grass Dump Site ATR-FTIR Particle and Spectra Images**

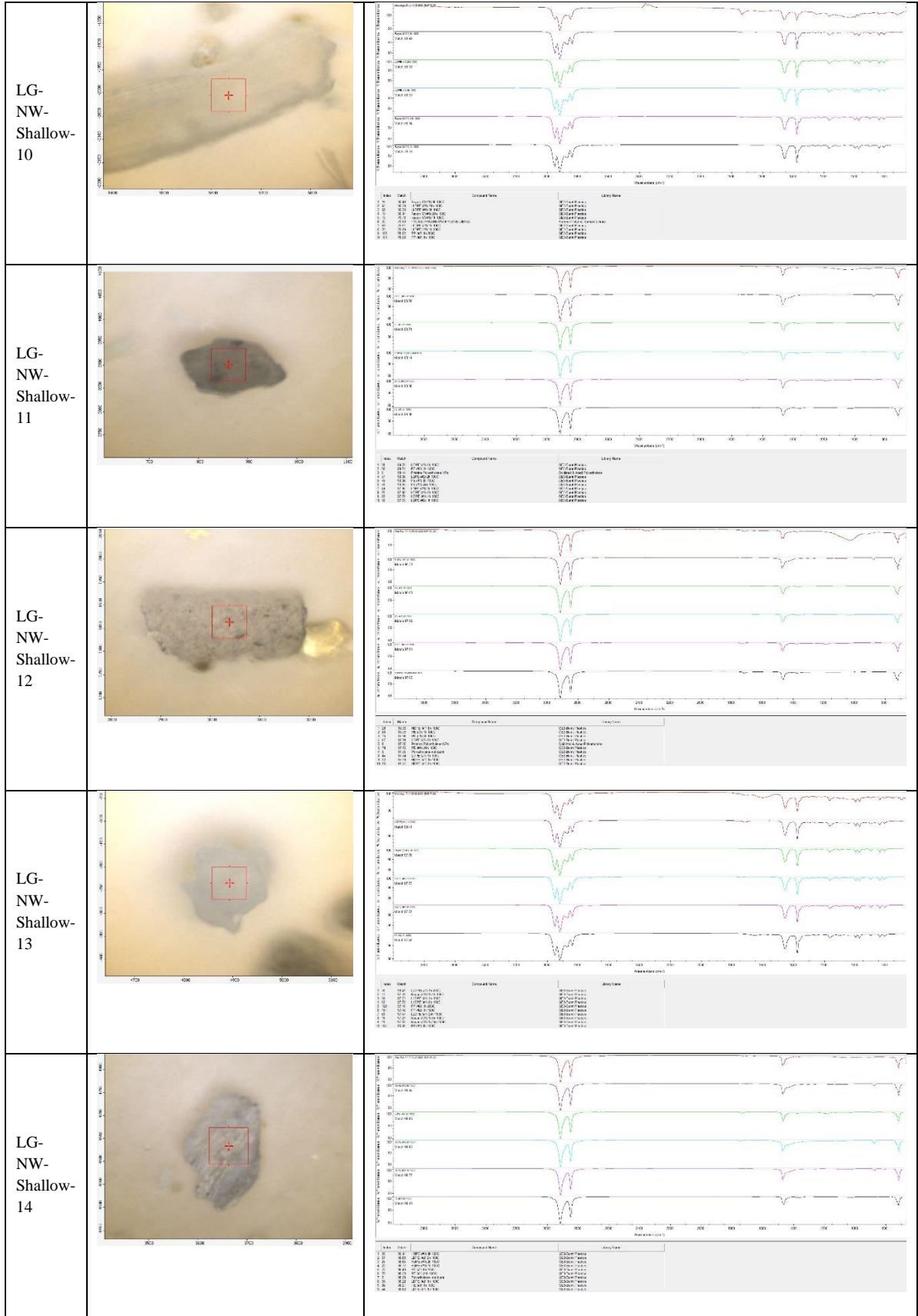
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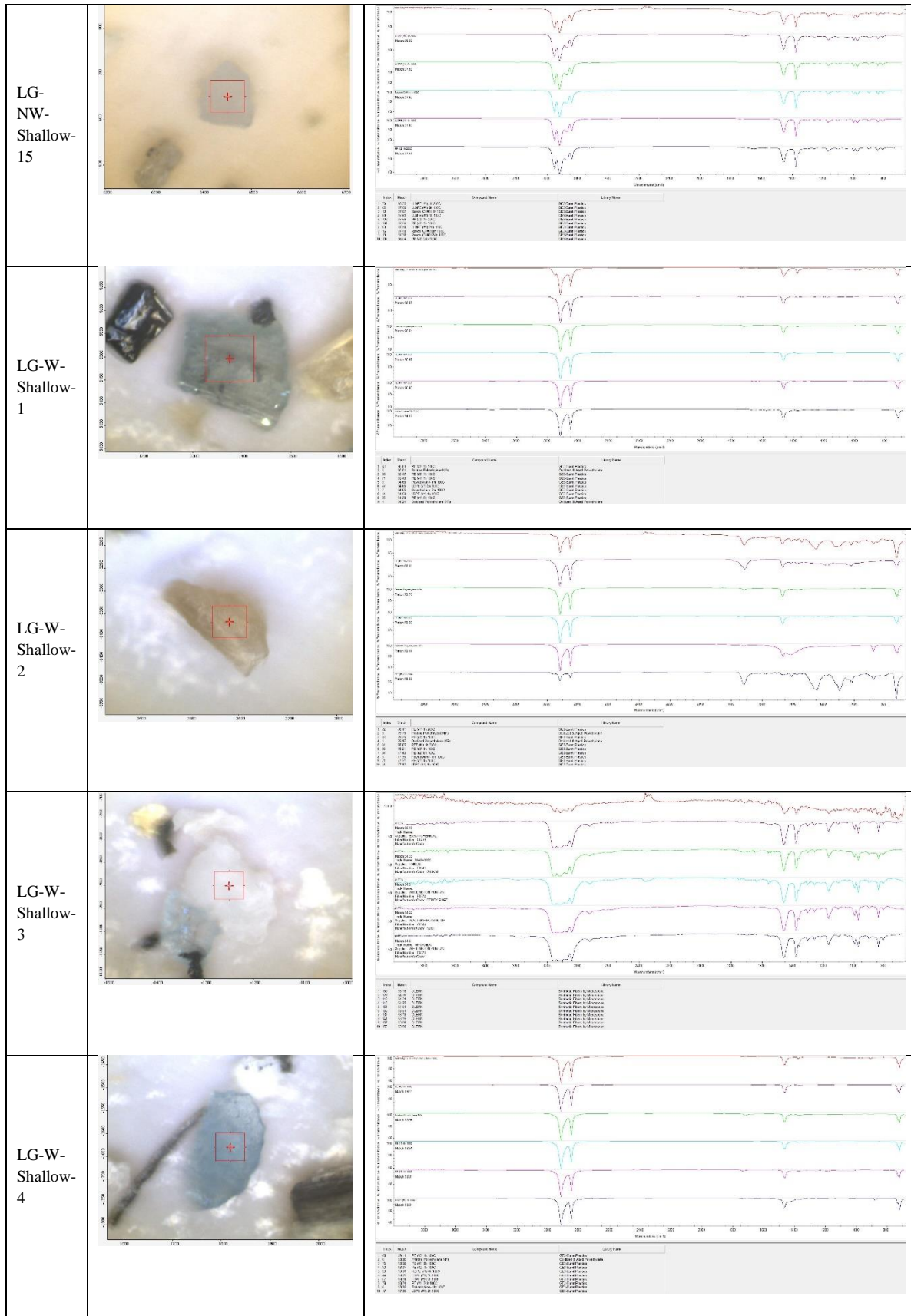




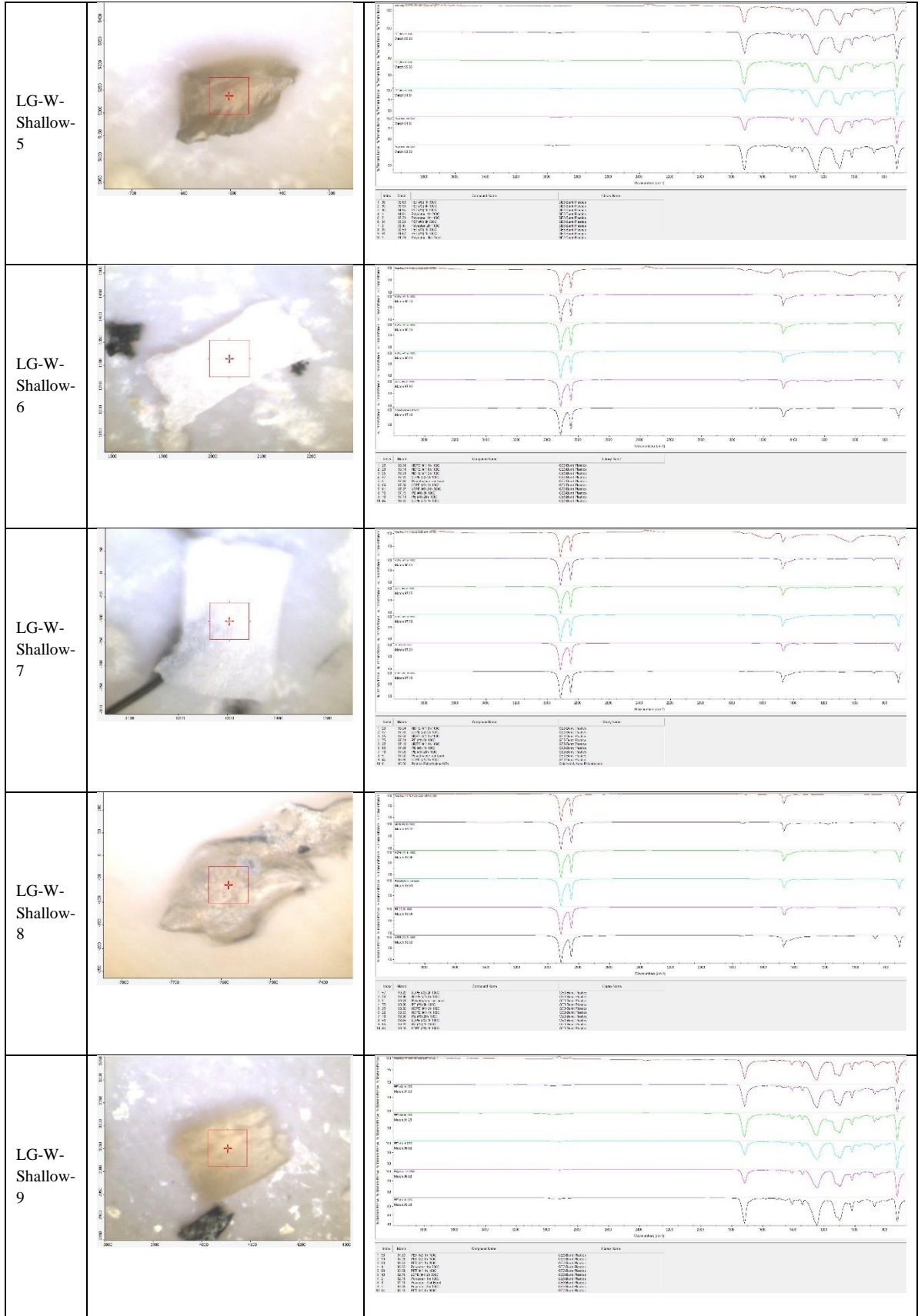


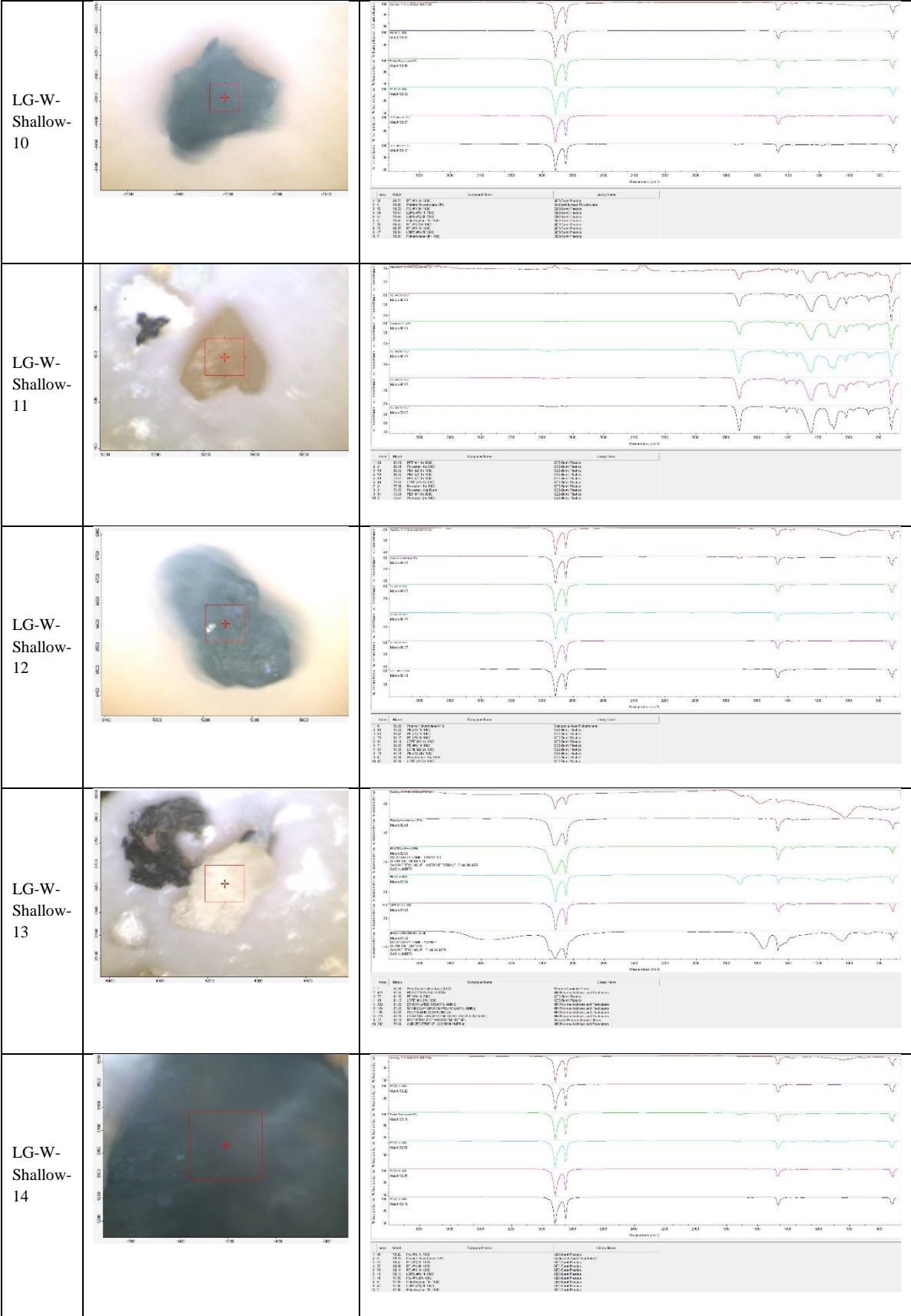


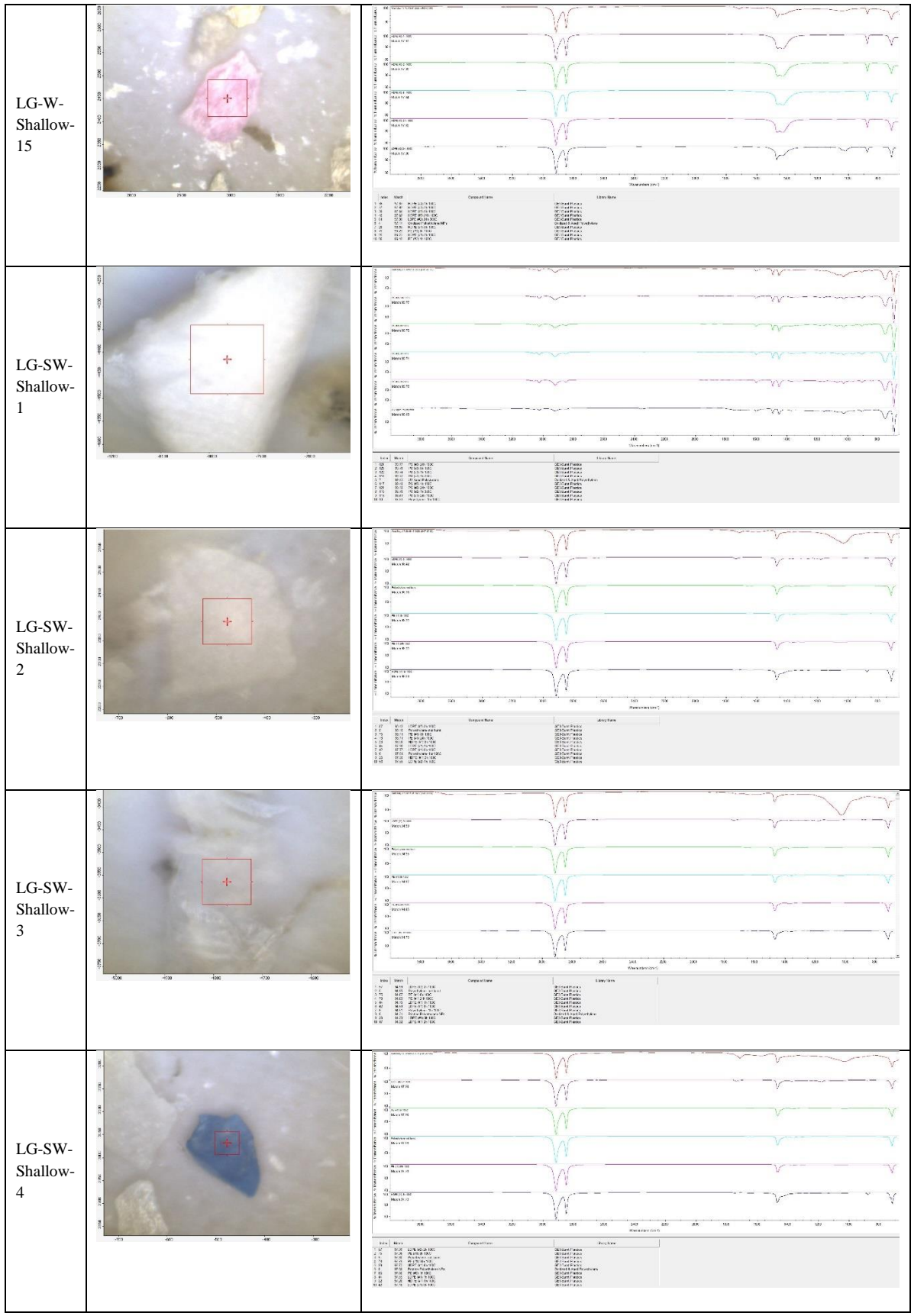




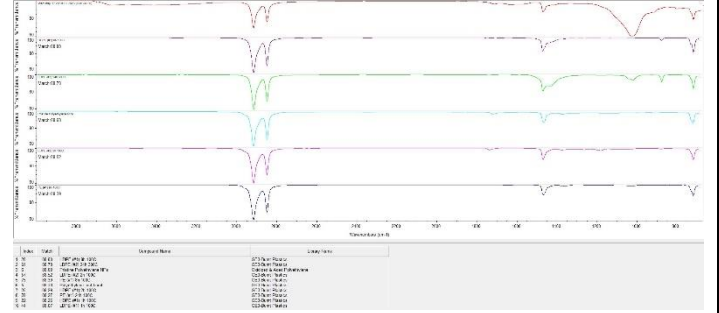




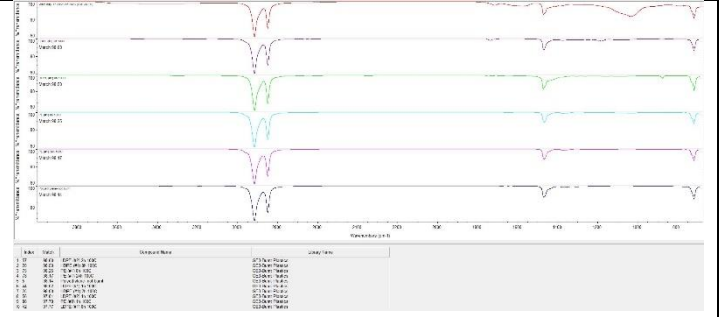
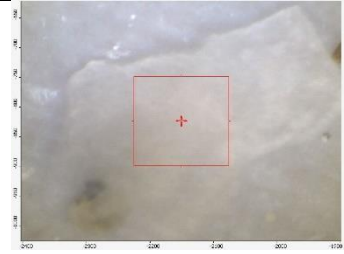




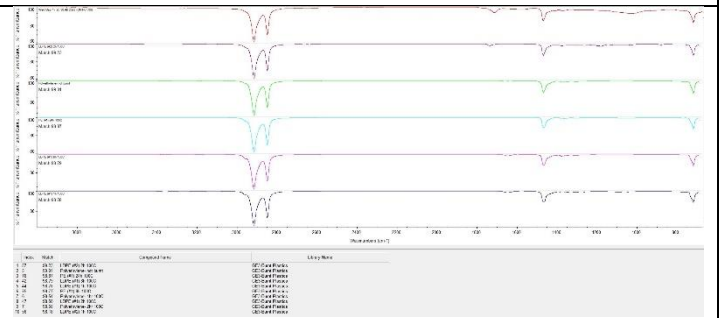
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Shallow-  
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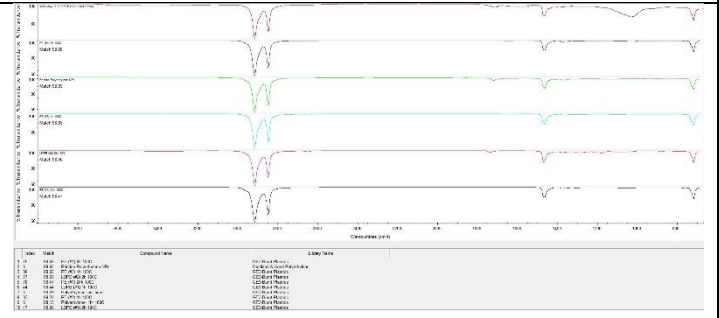
LG-SW-  
Shallow-  
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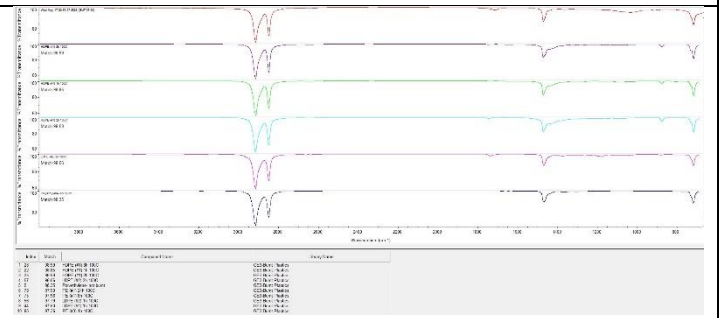
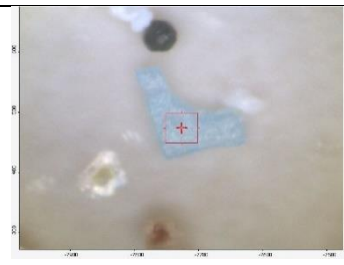
LG-SW-  
Shallow-  
7

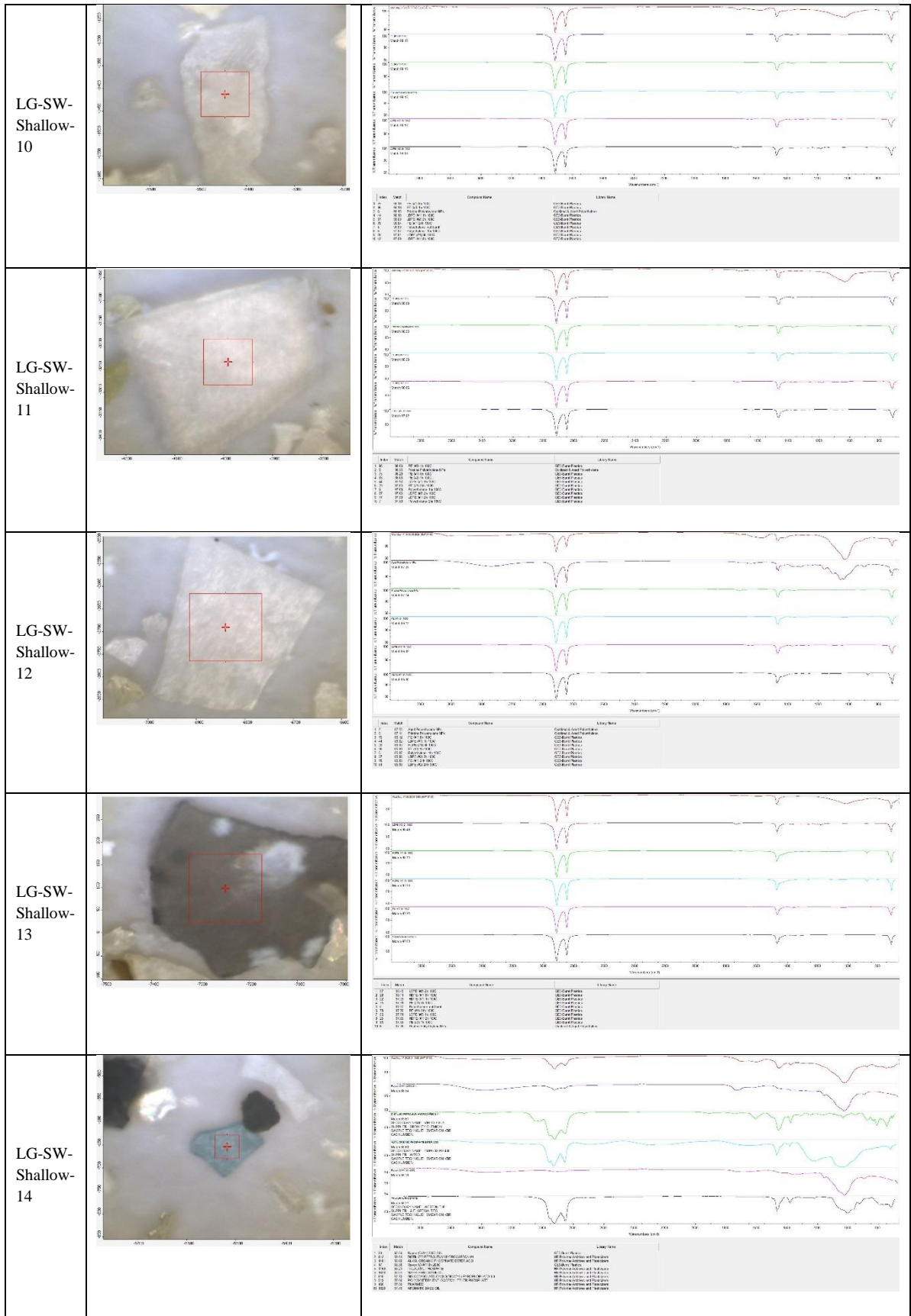


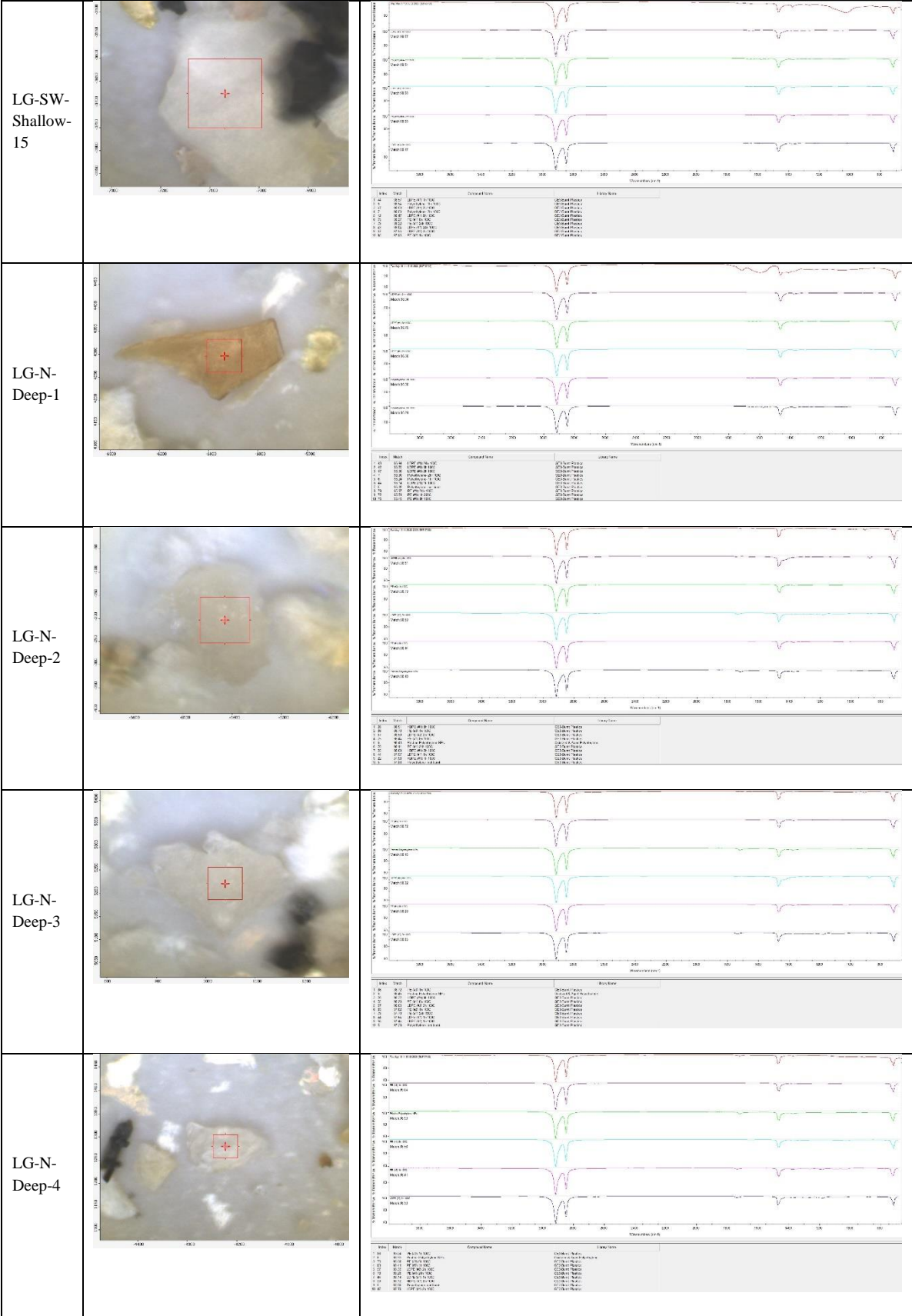
LG-SW-  
Shallow-  
8

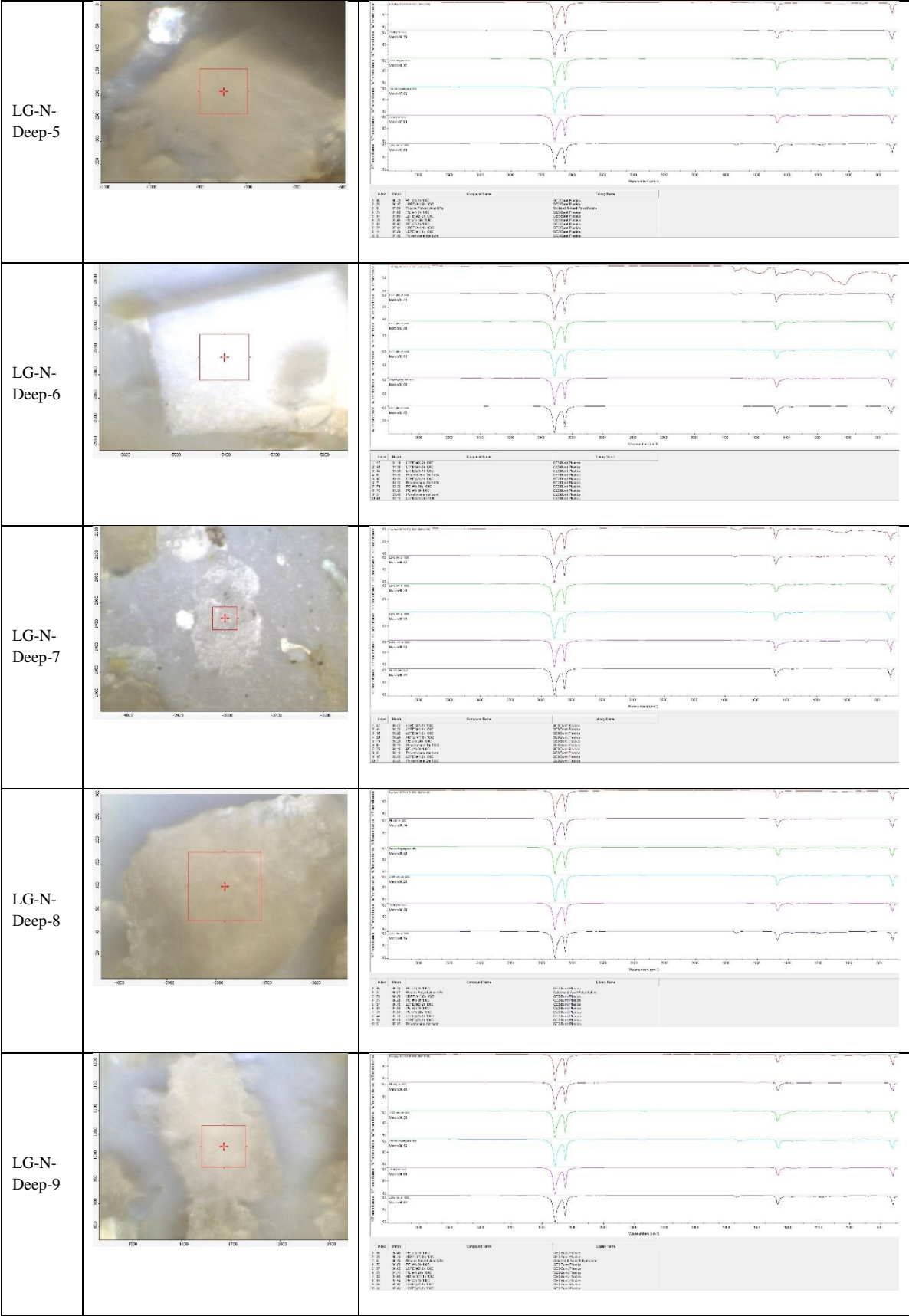


LG-SW-  
Shallow-  
9

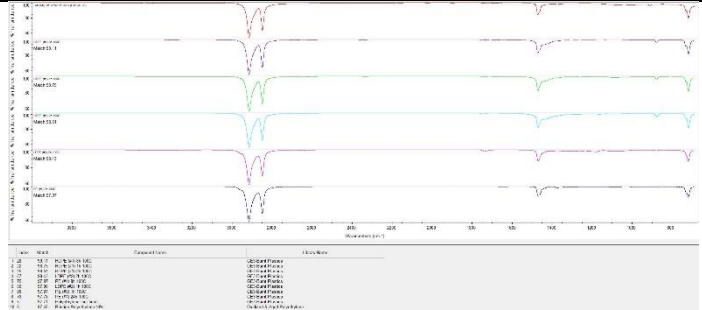




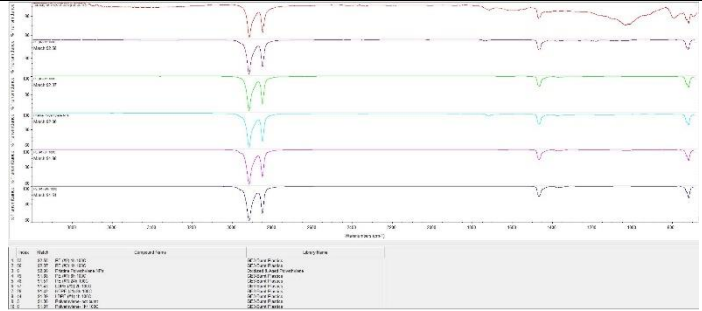
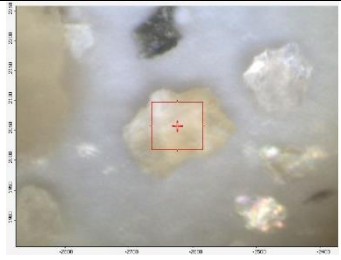




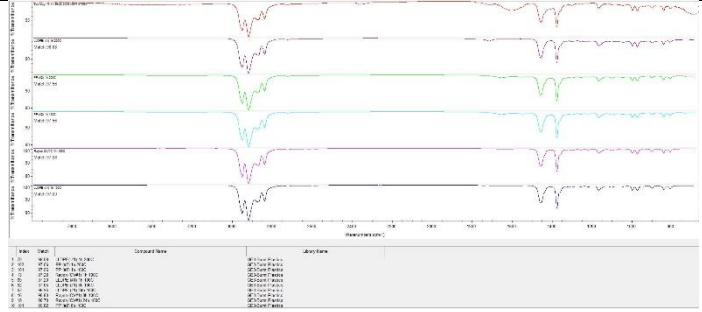
LG-N-Deep-10



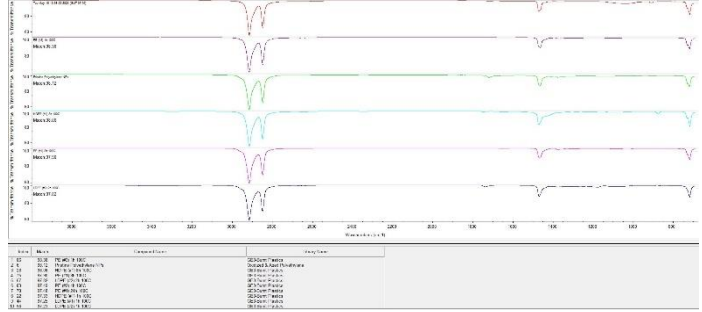
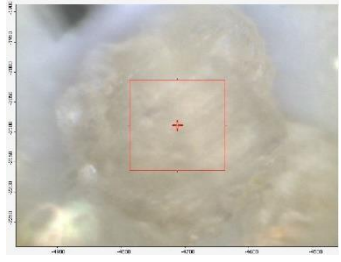
LG-N-Deep-11



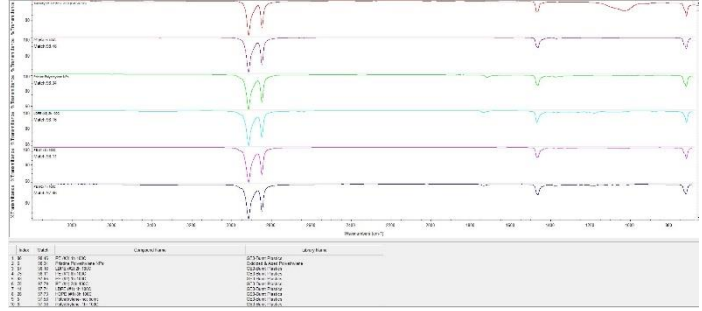
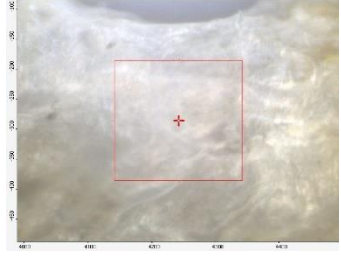
LG-N-Deep-12



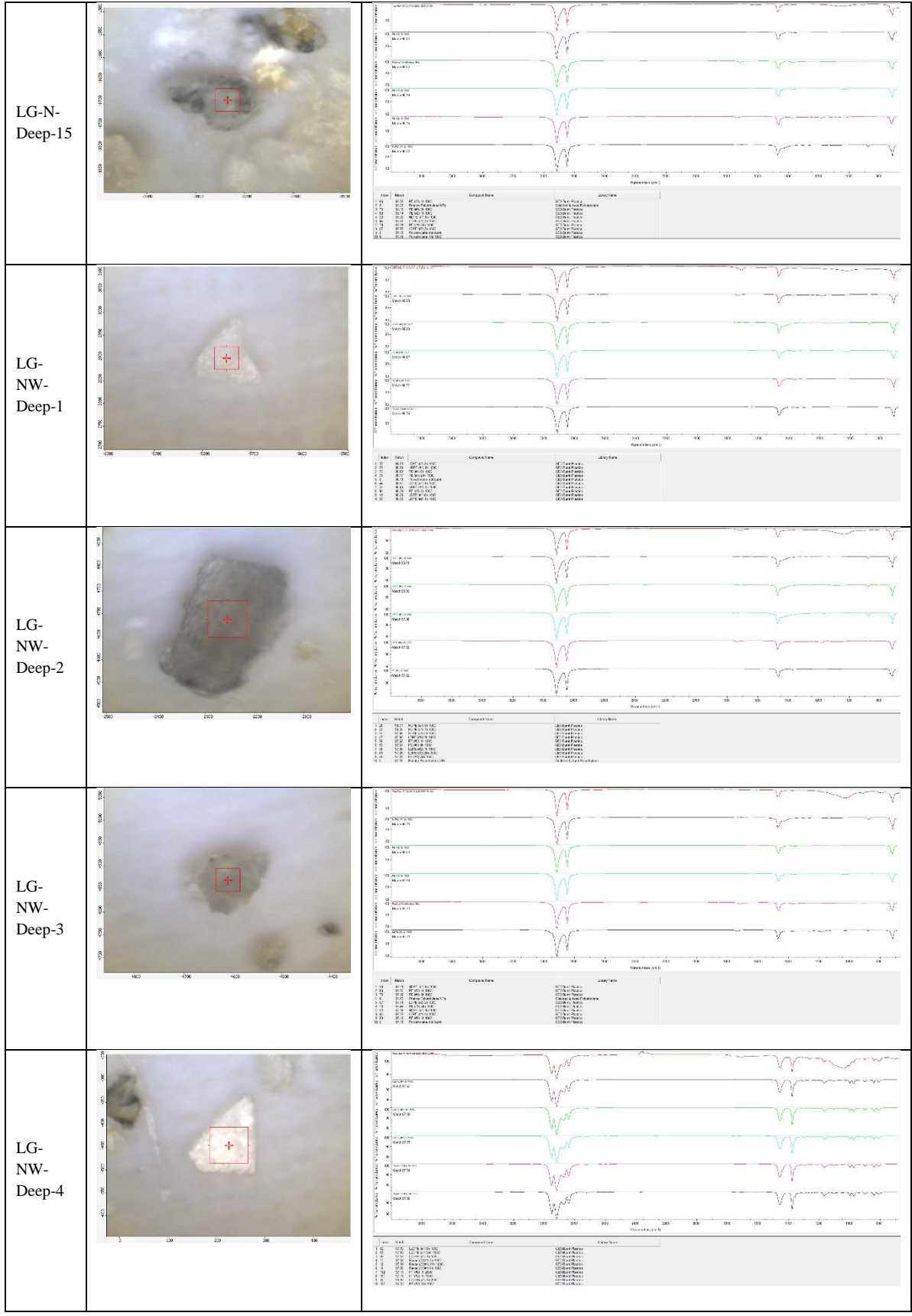
LG-N-Deep-13

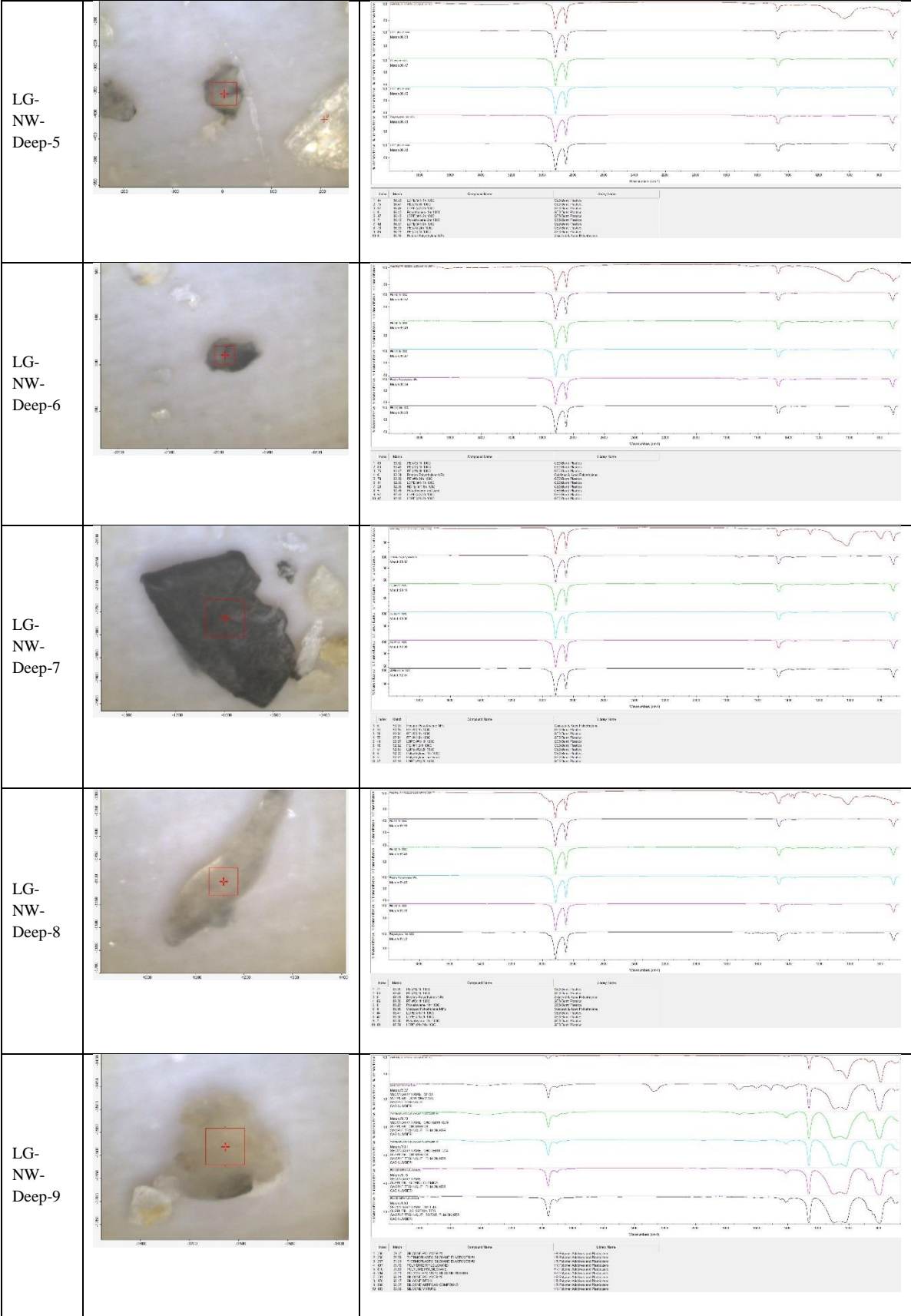


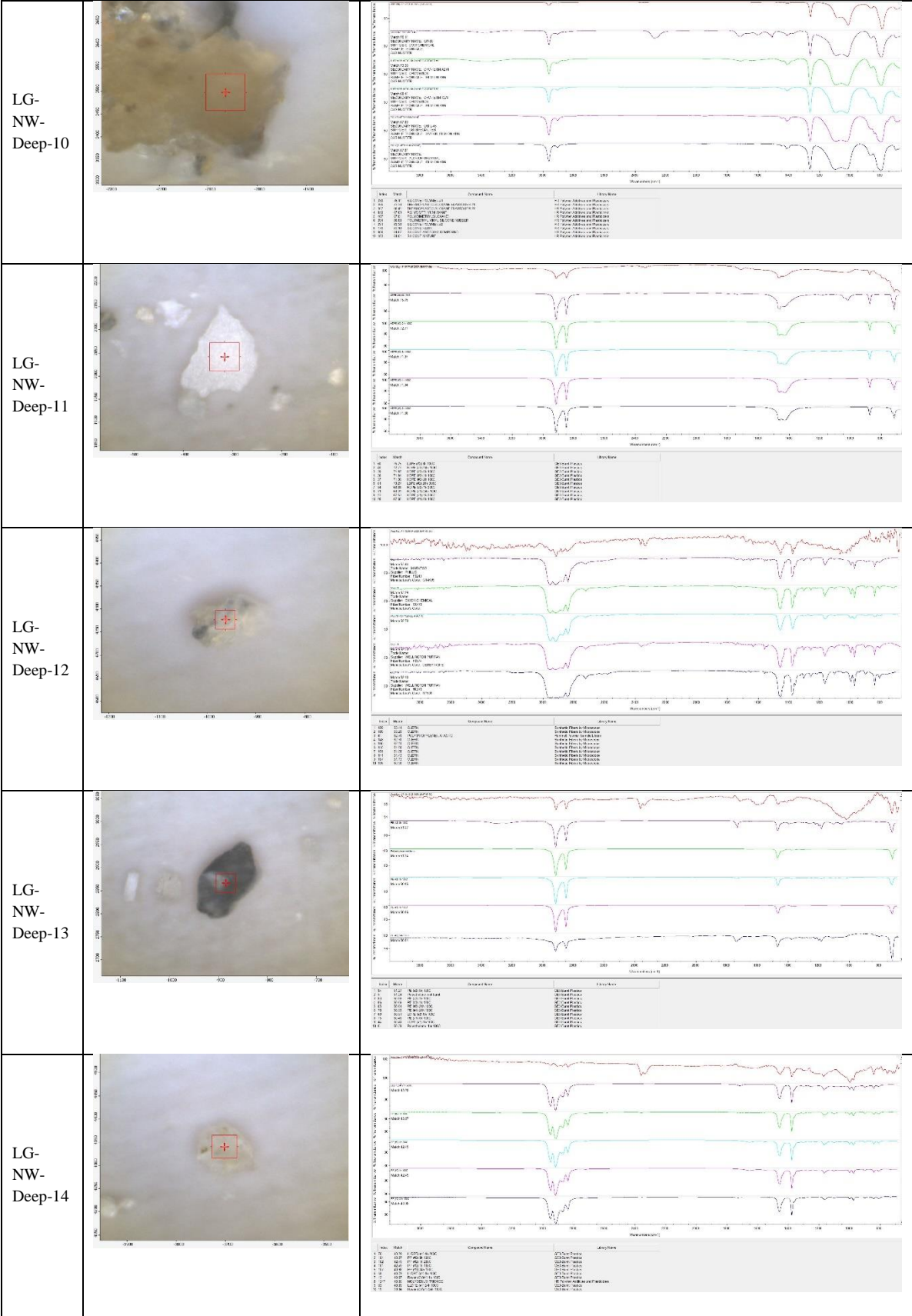
LG-N-Deep-14

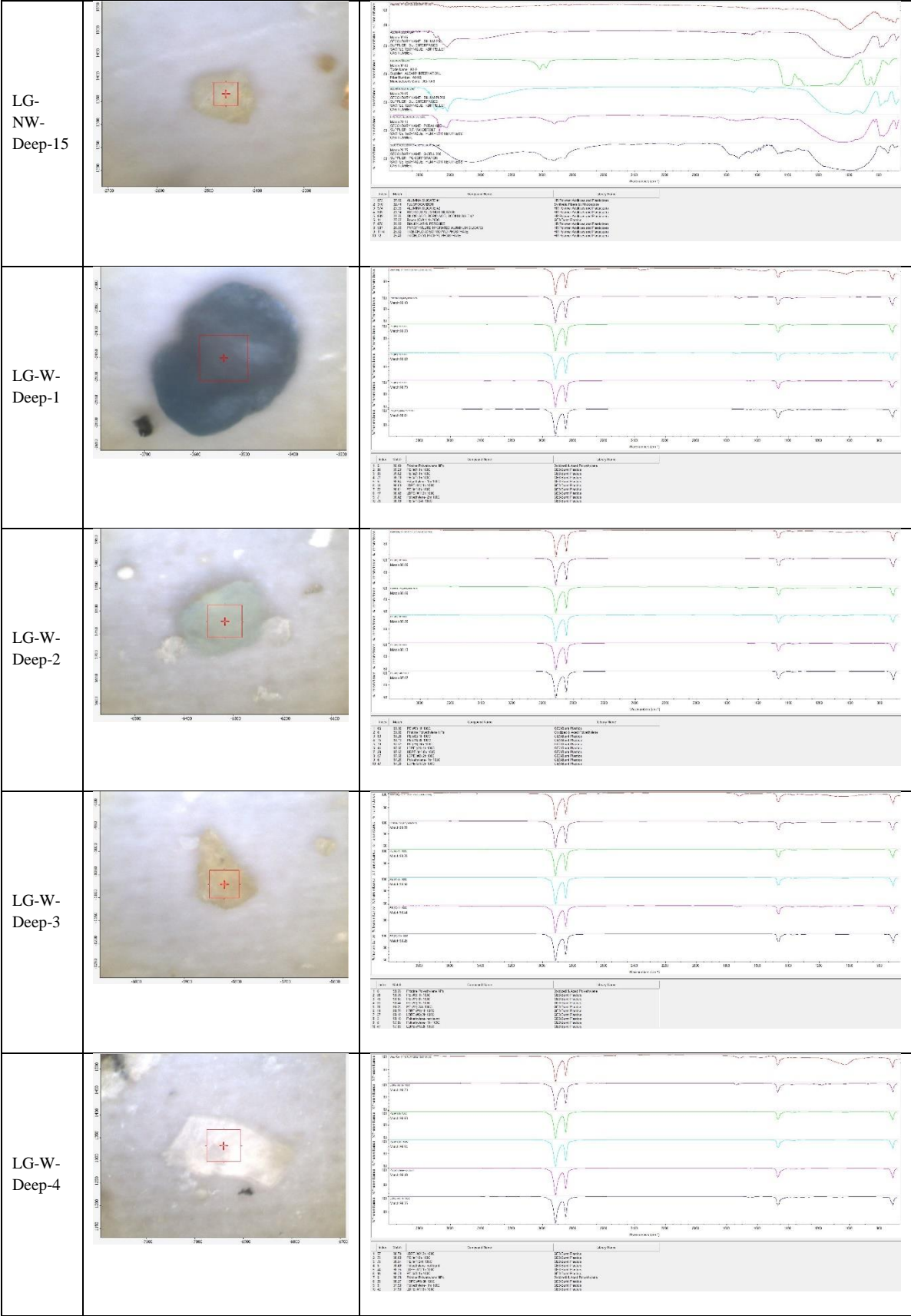


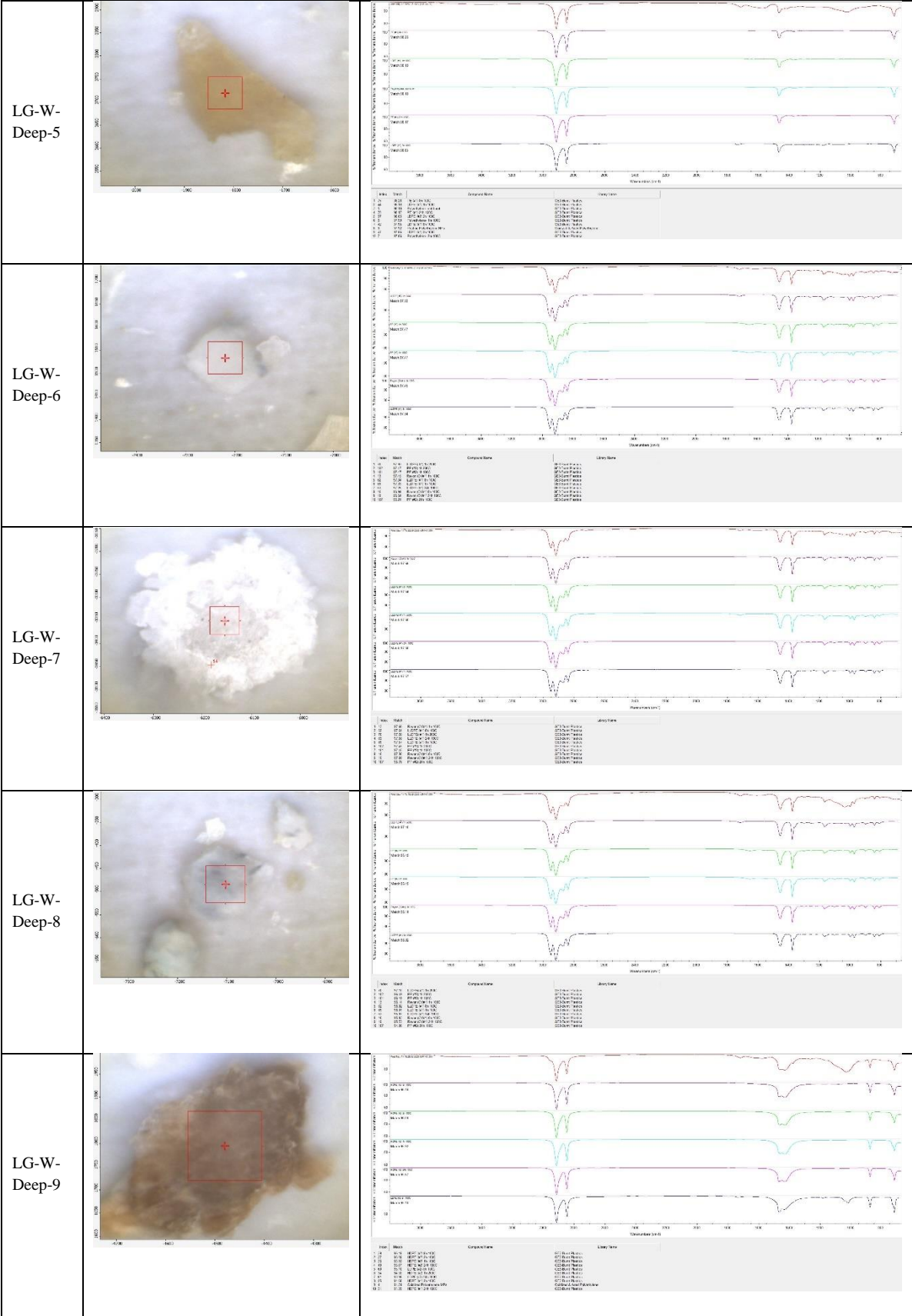


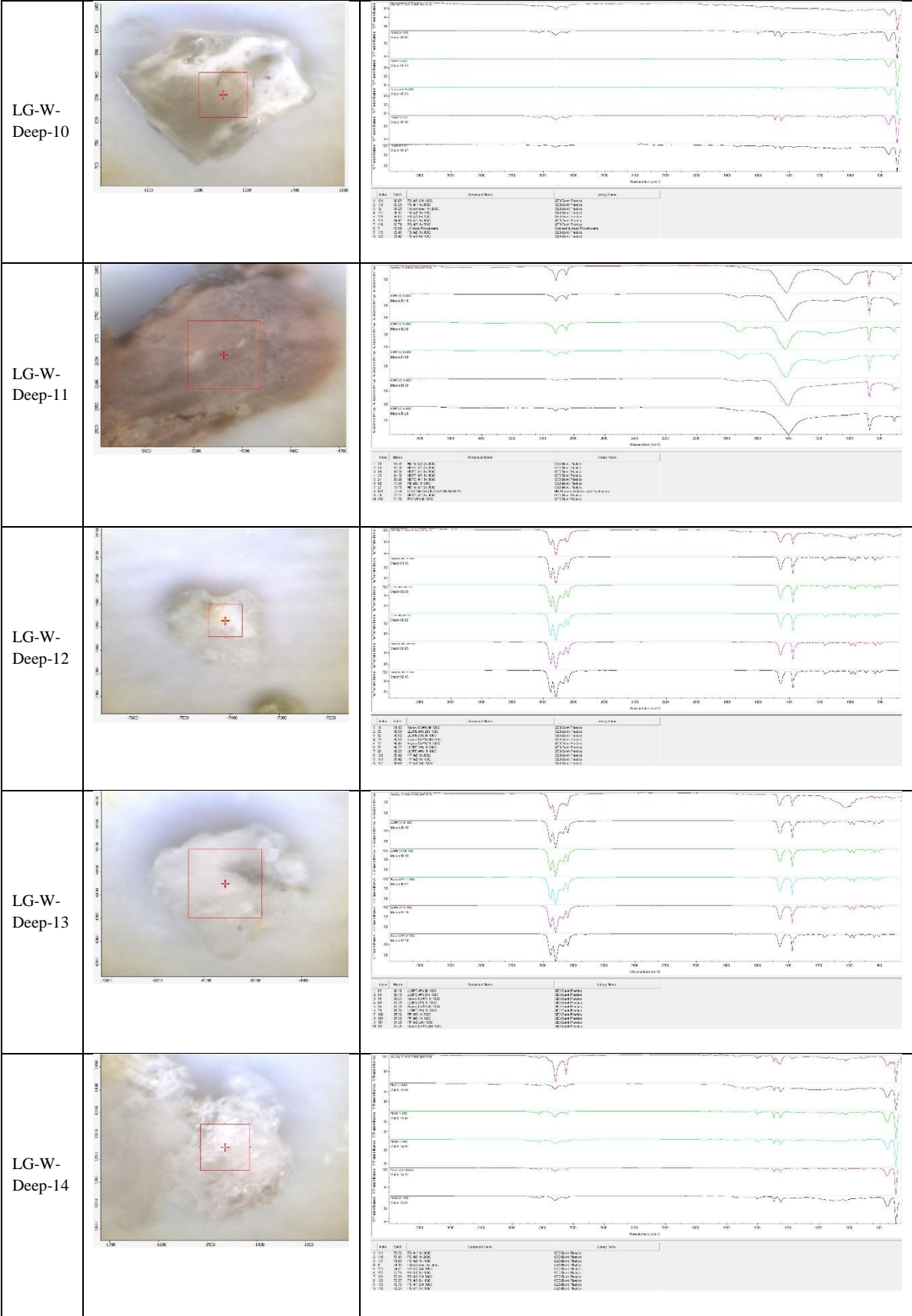


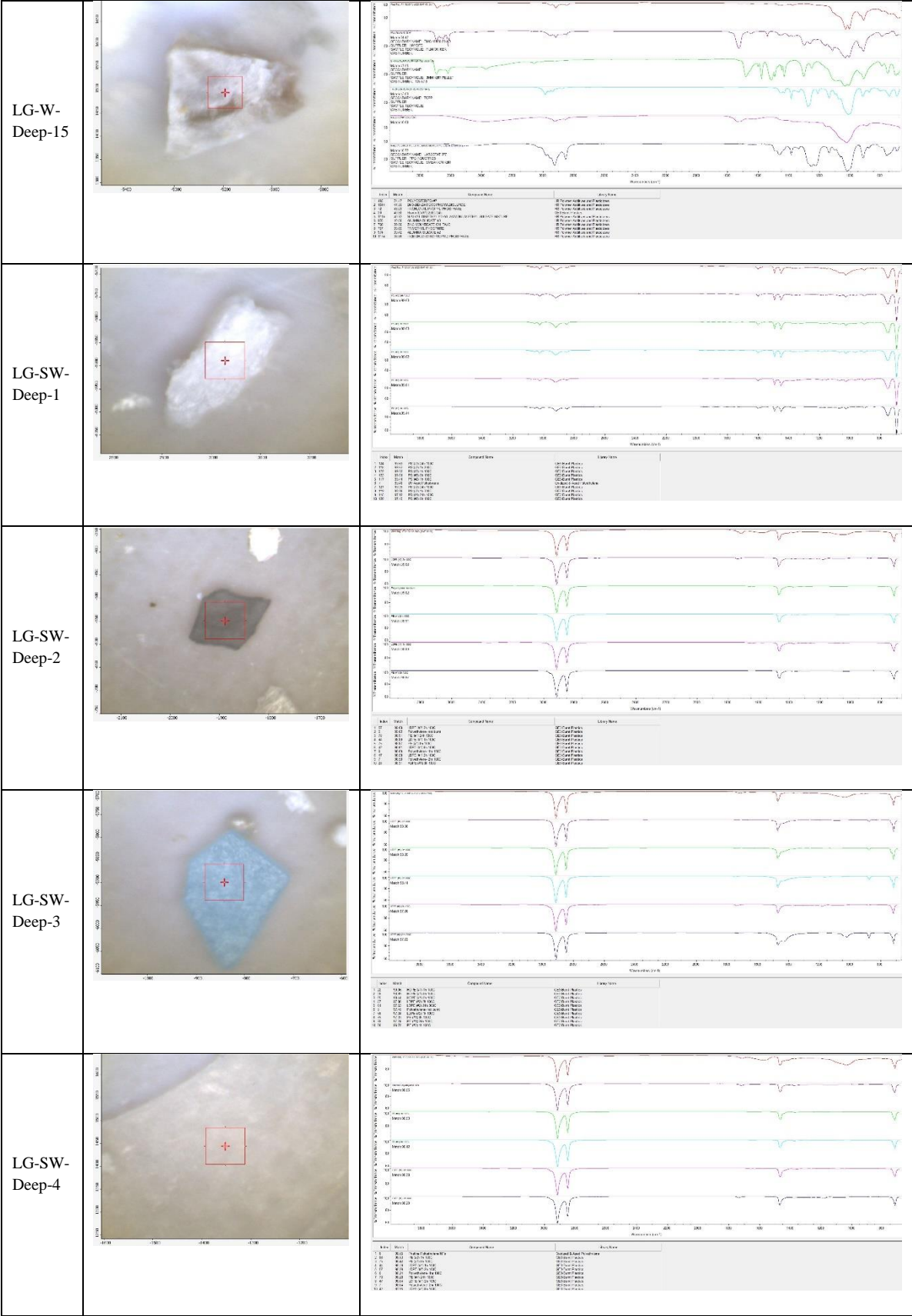


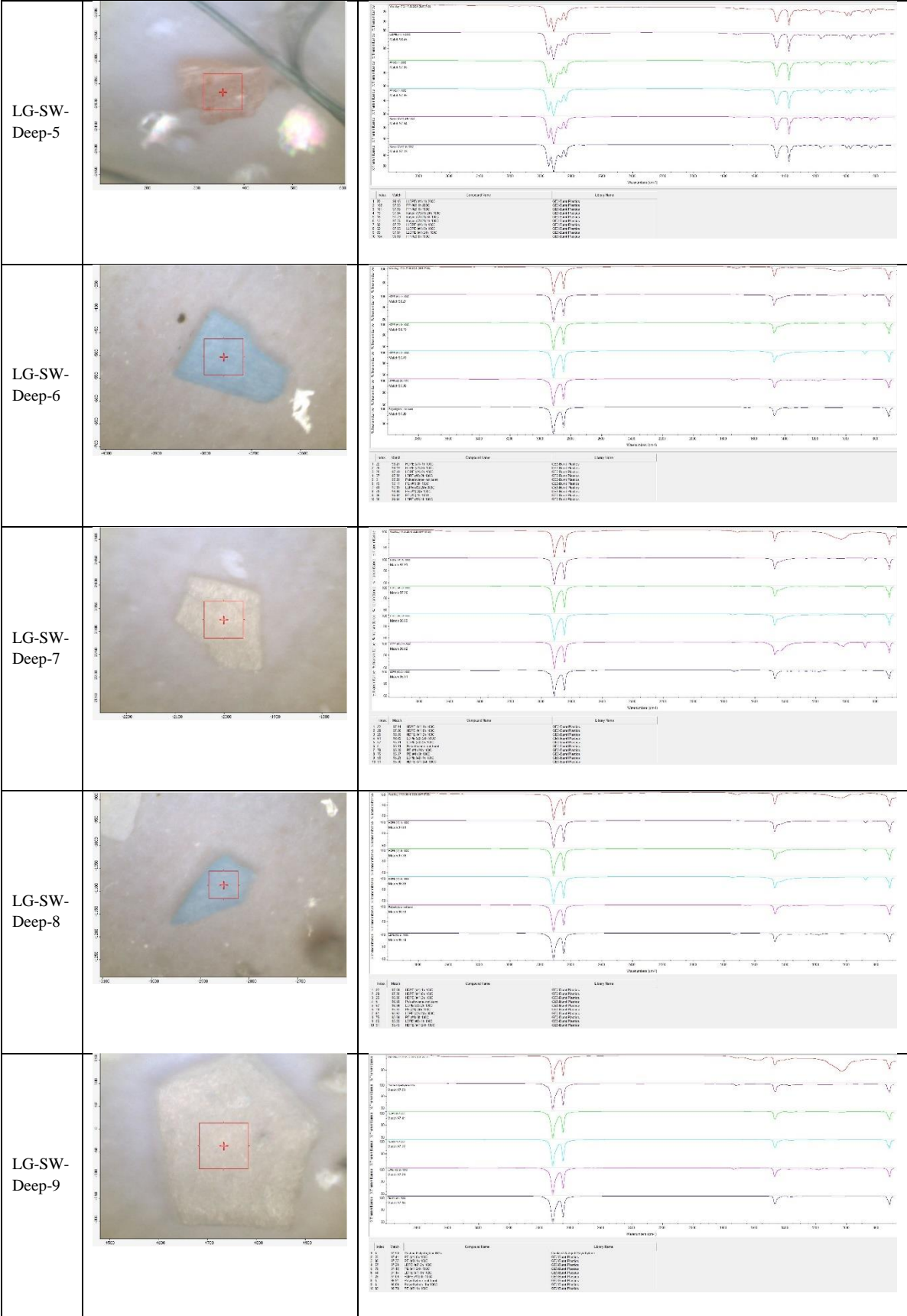




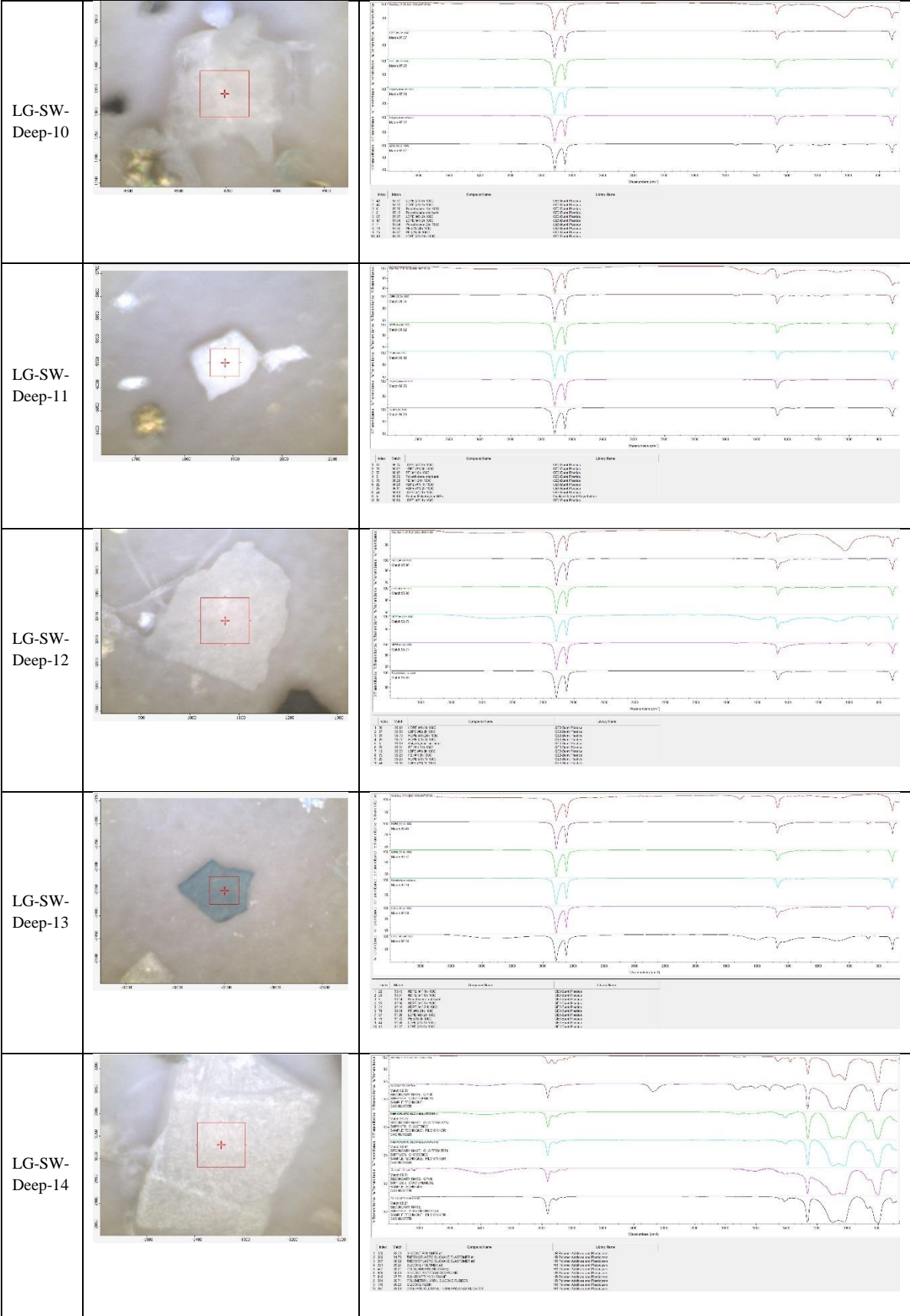


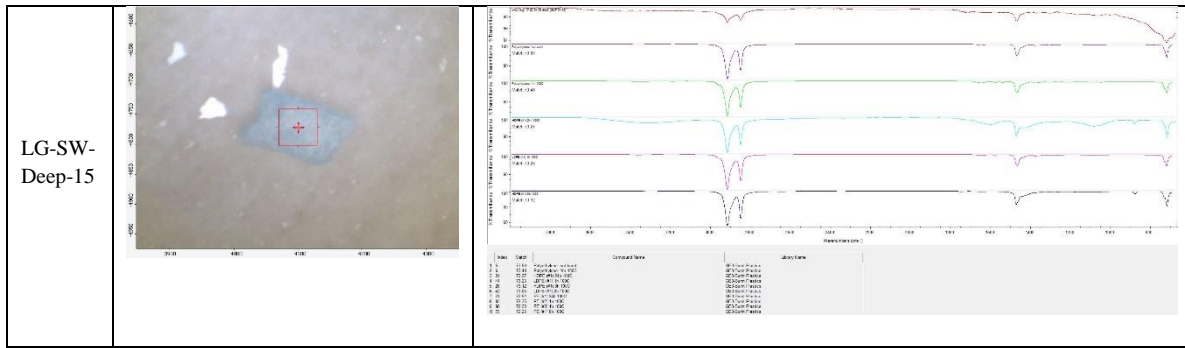




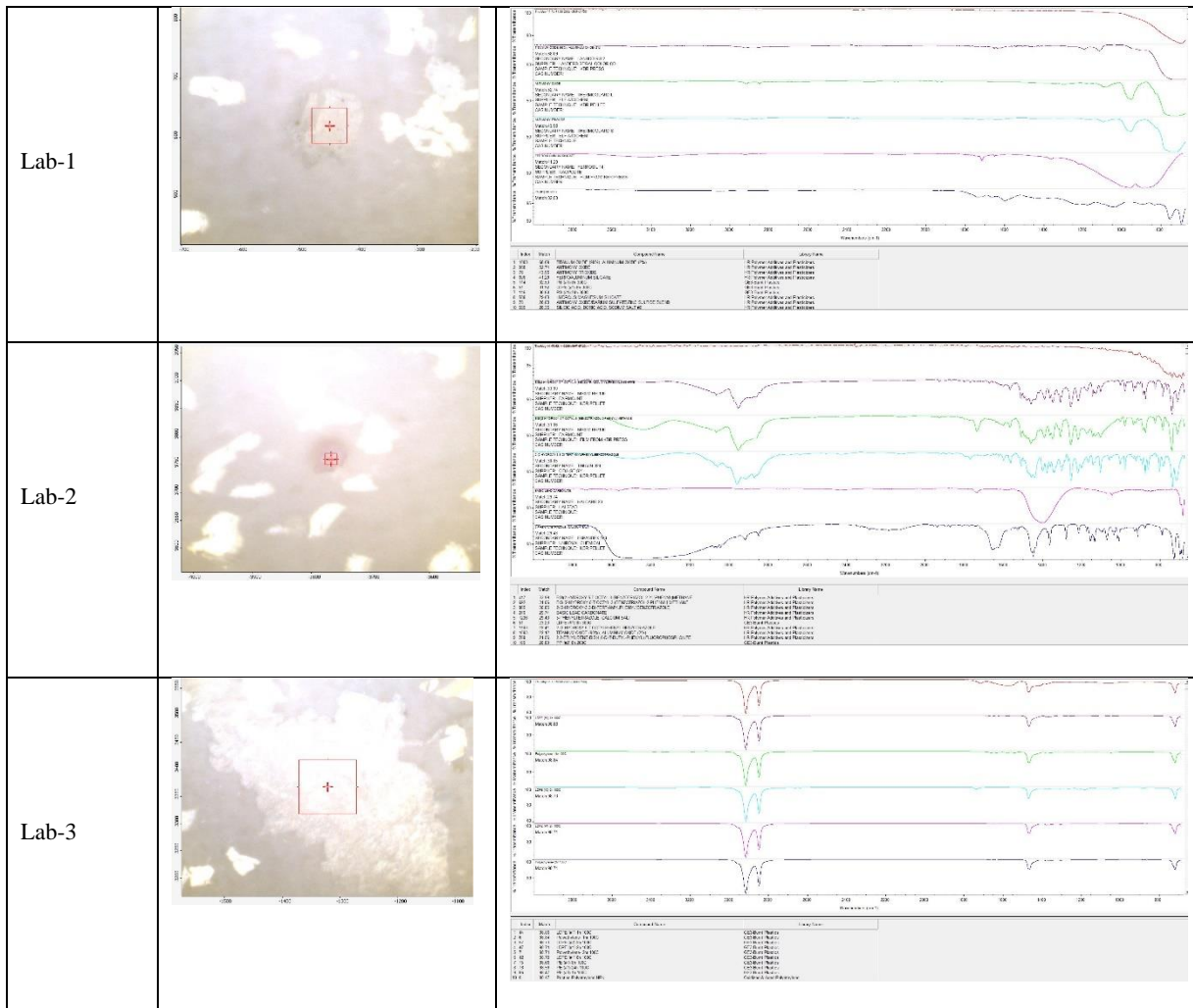


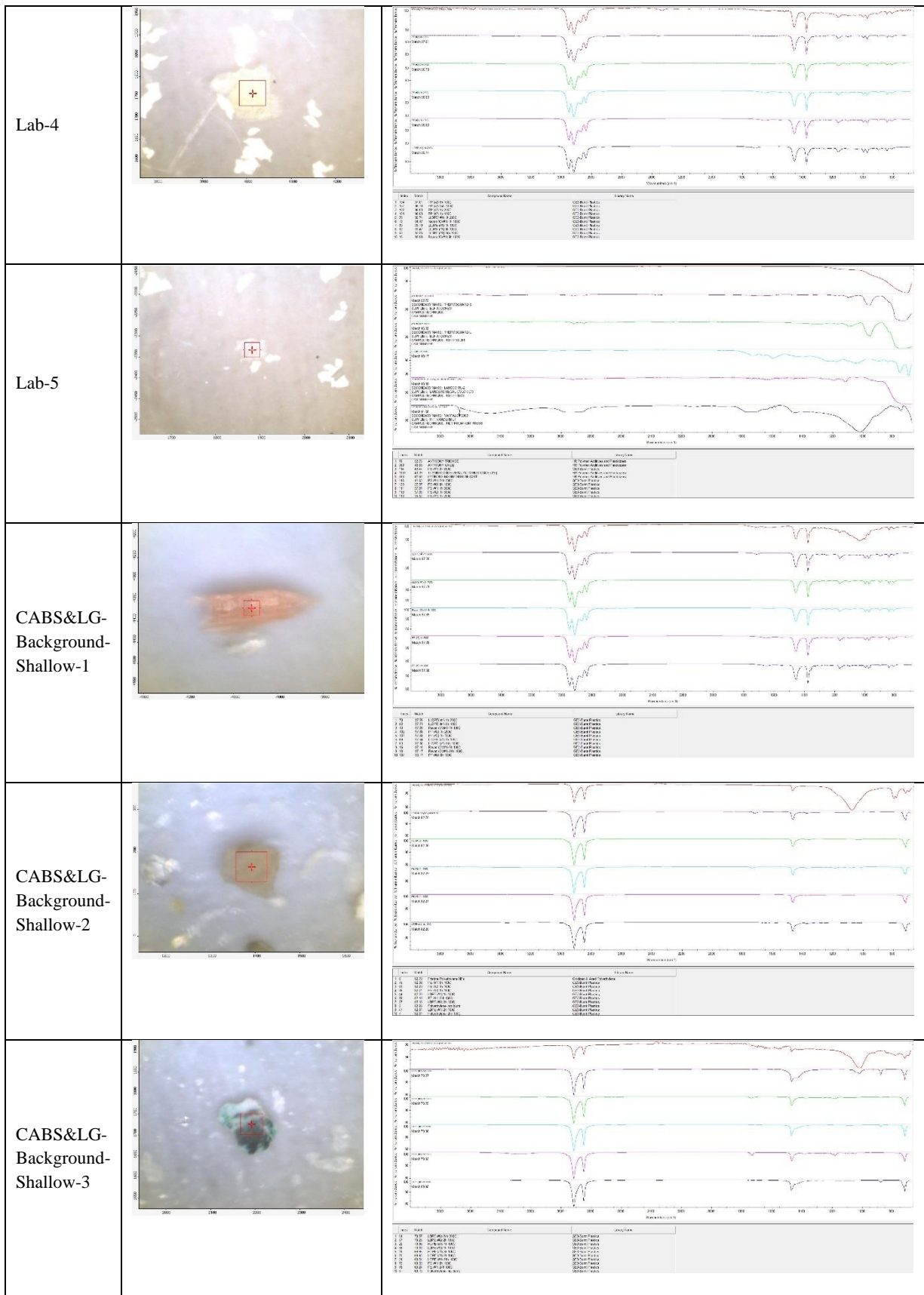


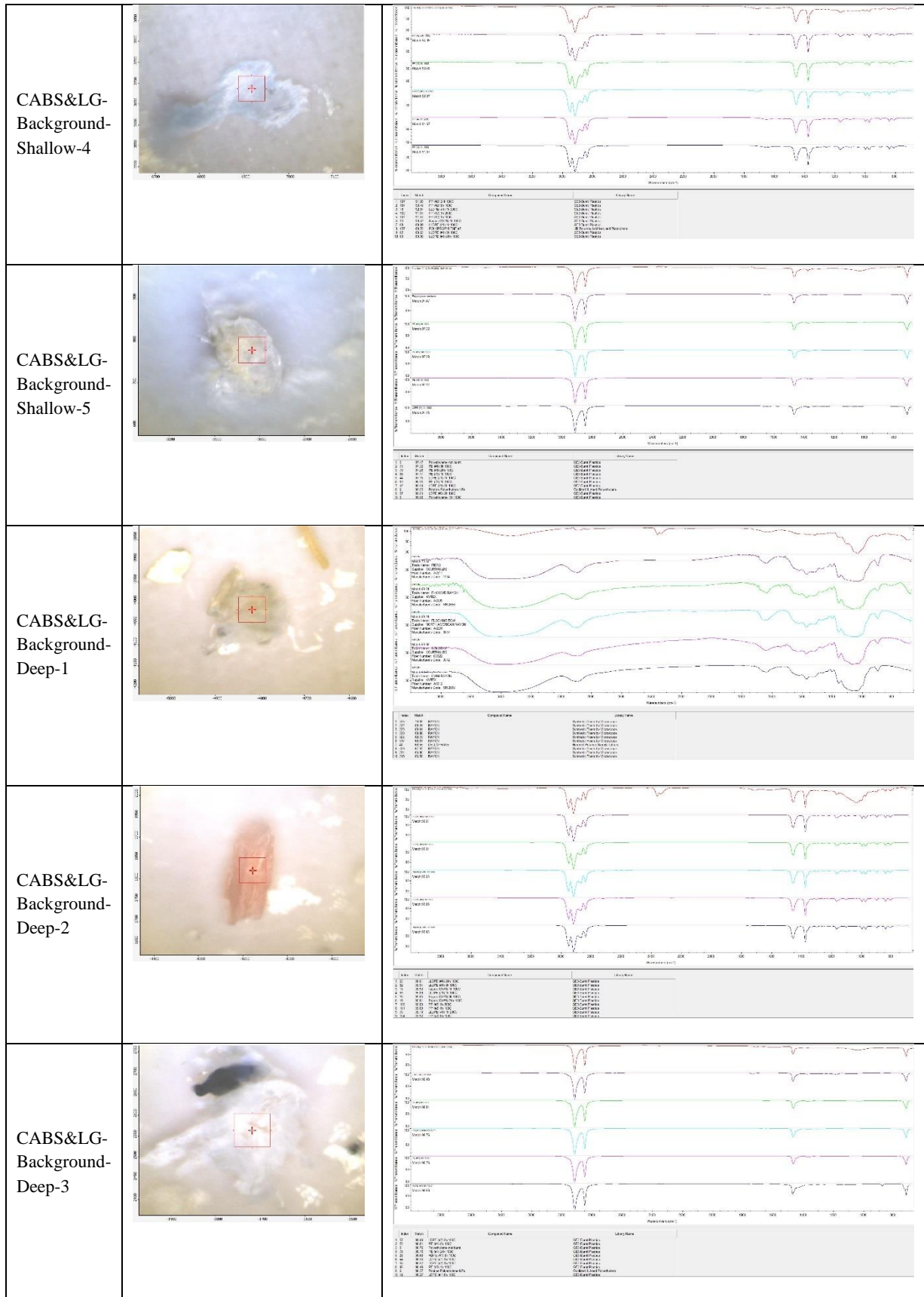


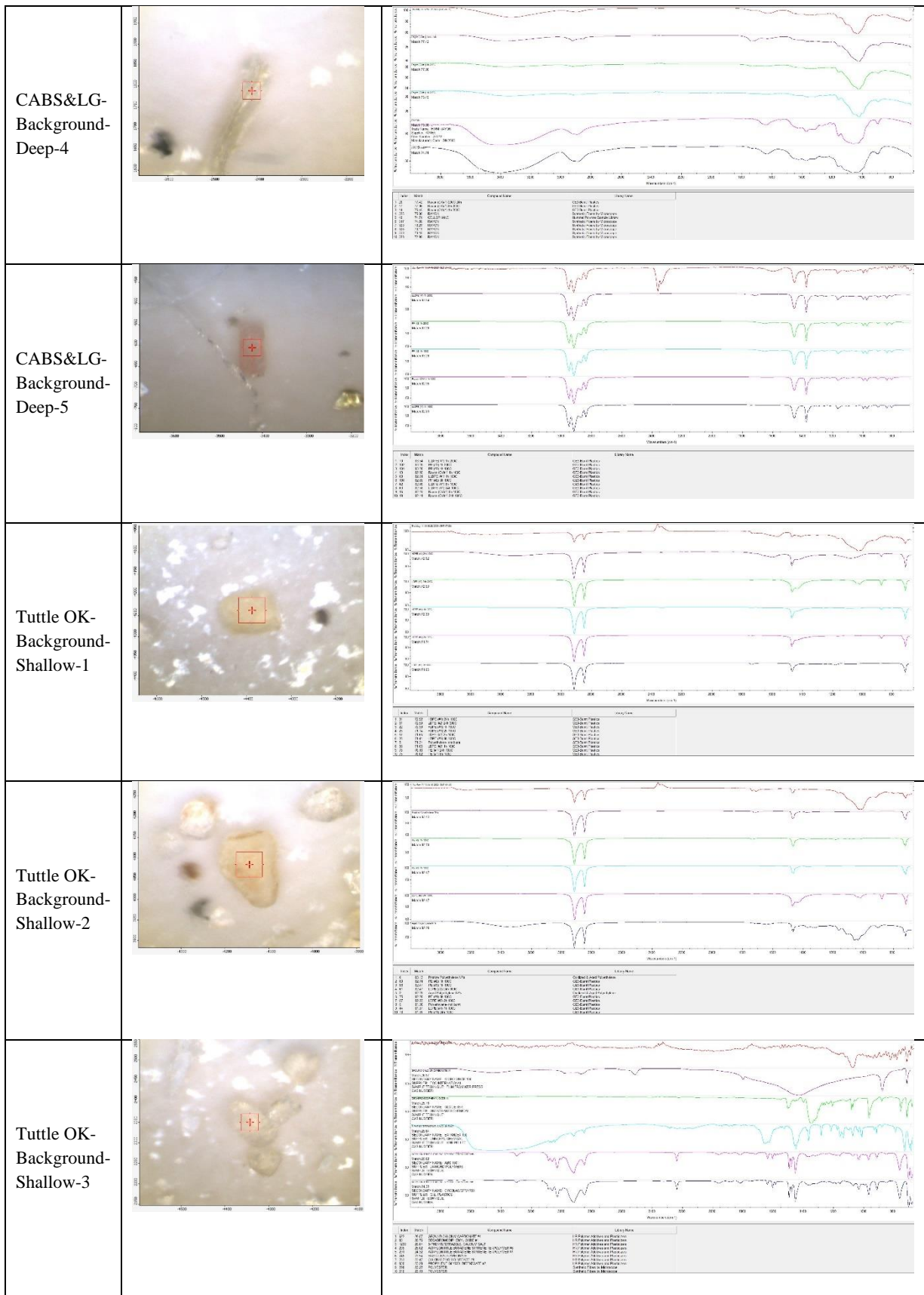


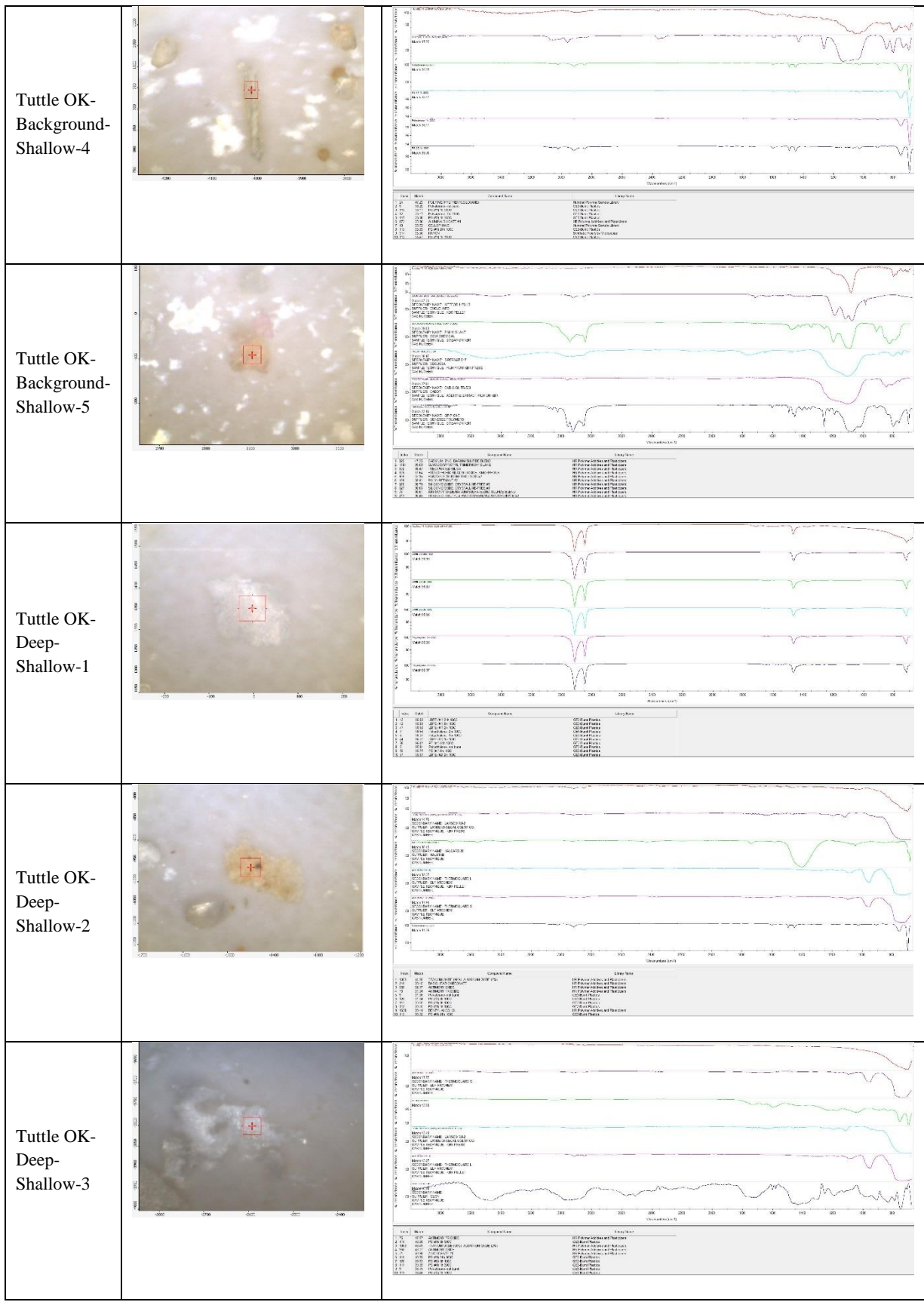
**Table S20: Lab Control and Background Sites ATR-FTIR Particle and Spectra Images**



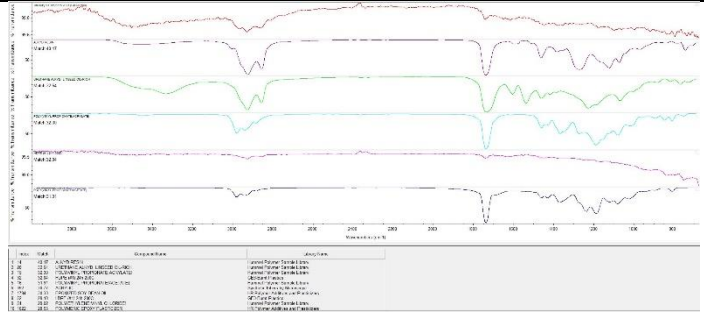
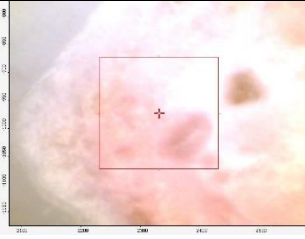




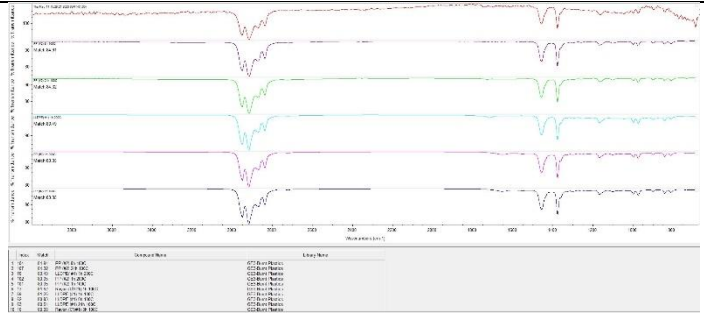
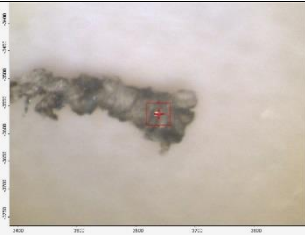




Tuttle OK-  
Deep-  
Shallow-4



Tuttle OK-  
Deep-  
Shallow-5



**Table S21.** Independent T-test of the open dumping sites, background sites, and lab controls.

Location		Lodge Grass				Crow Agency				Tuttle				
Depth	Lab	0-9cm		9-18cm		0-9cm		9-18cm		0-9cm		9-18cm		
Sample	Control	Background	Site	Background	Site	Background	Site	Background	Site	Background	Site	Background	Site	
Data Points	21	54	149	25	367	54	174	25	215	29	9	34	72	
	46	6	140	23	50	6	93	23	44	15	17	18	23	
	23	12	287	43	132	12	74	43	165	32	19	40	15	
			161		173		216		224		12			19
			79				60		131		19			12
			350		216		151		136		27			
			162		113		176		68		31			17
			318		270		144		329		15			31
			23		376		236		207		11			23
			75		104		54		131		30			68
			134		188		178		91					18
			272		199		212		320					21
	Average	30	24	179	30	199	24	147	30	172	25	19	31	29
Background vs. Site	p-value	0.000253		0.000146		0.000309		0.000101		0.178		0.430		
vs. Lab Control	p-value	0.374	0.000204	0.488	0.000142	0.374	0.000027	0.488	0.000101	0.328	0.151	0.476	0.463	
0-9cm vs. 9-18cm	p-value	0.327				0.227				0.082				
Open Burn vs. Open Dump (p-value)														
Depth		0-9cm	9-18cm											
Lodge Grass vs Crow Agency		0.188	0.257											

## Analysis of Variance

Source	DF	Adj SS	Adj MS	F-Value	P-Value
Factor	12	500712	41726	8.53	0.000
Error	76	371552	4889		
Total	88	872264			

Three outliers were identified:

- 692: Lodge Grass Site 9-18cm
- 123: Tuttle Site 0-9cm
- 195: Tuttle Site 9-18cm

These were omitted from further analysis.

Tuttle Site 9-18cm failed the normality test ( $p < 0.05$ ). This was included in further analysis but should be noted.

ANOVA indicated that at least one set of sample means was significantly different ( $p < 0.05$ ).

Four samples were determined to be significantly greater than the lab control (Lodge Grass Site and Crow Agency Site, both depths). All other samples were statistically identical in particle quantity to the lab control, indicating that these samples were below our level of quantification.



Four samples were determined to be significantly greater than the environmental control (Lodge Grass and Crow Agency, both depths). This indicates that these burn- and open dump sites are significant contributors to microplastic pollution in the local environment. No significant difference was observed for the Tuttle site, indicating that this site is not a significant contributor to microplastic pollution in the area. No significant differences were observed between depths for the same site. No significant differences were observed between open burn and open dump for either depth.