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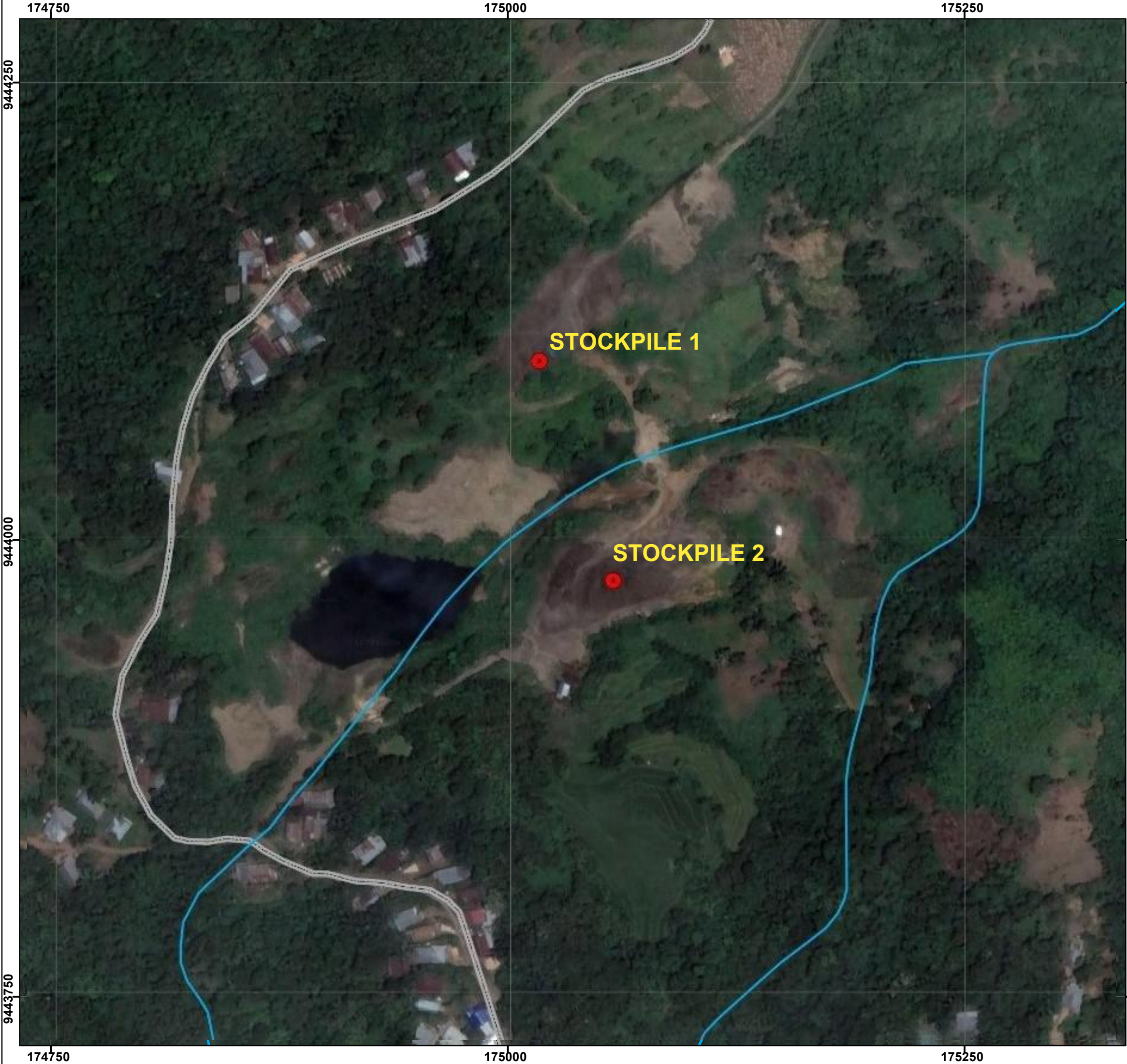
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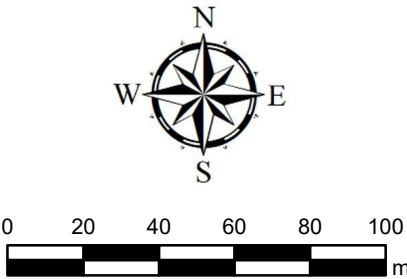
LAMPIRAN

LAMPIRAN 1
PETA LOKASI
PENGAMBILAN SAMPEL

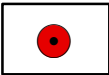


**PROGRAM PASCASARJANA DEPARTEMEN
TEKNIK PERTAMBANGAN FAKULTAS
TEKNIK UNIVERSITAS HASANUDDIN**

**PETA CITRA SATELIT
LOKASI PENELITIAN
KECAMATAN BONTOCANI, KABUPATEN
BONE PROVINSI SULAWESI SELATAN**



LEGENDA

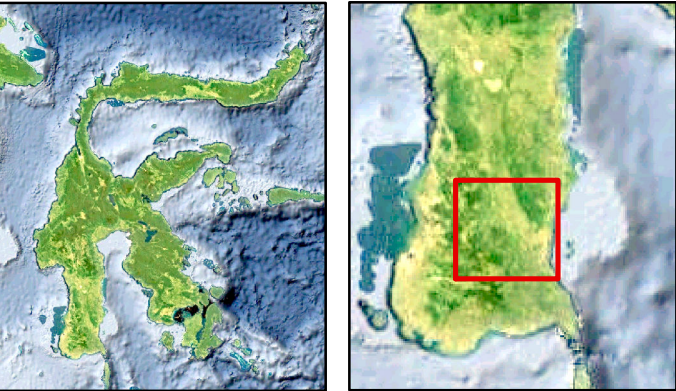
-  **LOKASI SAMPLING**
-  **SUNGAI**
-  **JALAN**

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INDEKS PETA



Coordinat System WGS 1984 UTM Zone 51S
Projection : Universal Tranverse Marcator
Dantum : WGS 1984

Sumber Peta
<https://tanahair.indonesia.go.id>
Citra Satellite Google Eart

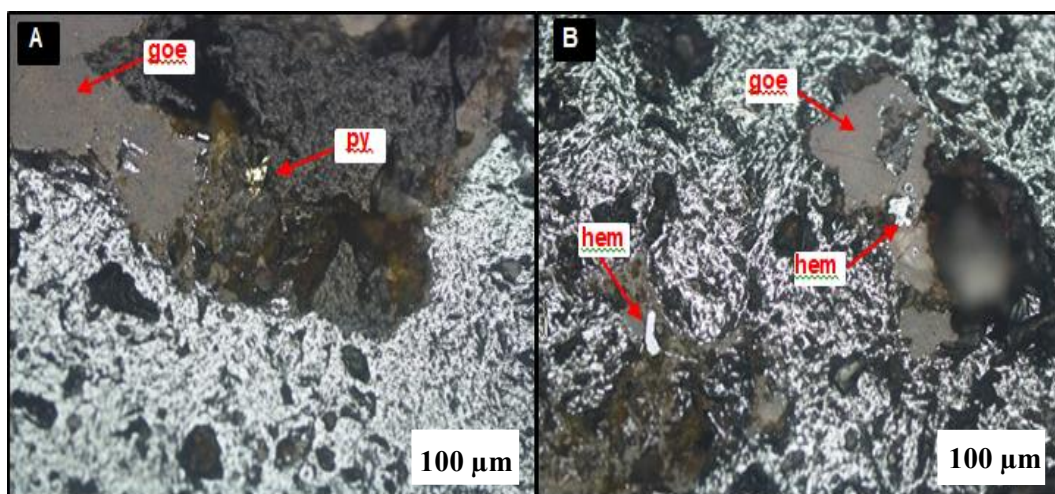
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LAMPIRAN 2

ANALISIS MIKROSKOPIS

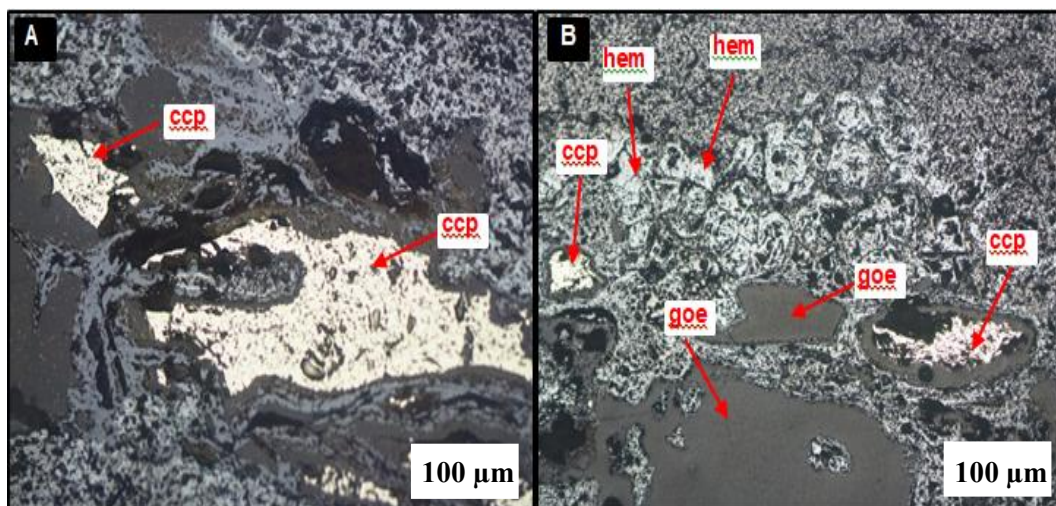
(MINERAGRAFI)

Nomor : 01		No. Sampel : ST-1B
Lokasi : <i>Stockpile 1</i>		Nama Batuan : Bijih Besi
Tipe Struktur (<i>Structure Of Type</i>) : <i>Desseminated</i>		
Tipe Endapan : <i>Skarn</i>		
Deskripsi (<i>Description</i>) : Kenampakan mineral-mineral logam hadir dalm bnetuk tersebar disseminated pada sampel bijih besi. Kenampakan dalam sayatan poles memperlihatkan kehadiran mineral logam yaitu pirit, hemati dan goetit dan sebagian terdapat massa dasar batuan berupa mineral pengotor.		
Komposisi Mineral (<i>Composition Of Mineral</i>)	Jumlah Amount (100%)	Keterangan Optik Mineral (<i>Description Of Optical Mineralogy</i>)
Pirit (FeS_2)	10 %	Berwarna kuning pucat, Berwarna hitam hingga abu-abu perak, disseminated berbutir kasar hingga halus, ukuran mineral 0,1, pleokrisme lemah, berbentuk anhedral, belahan sedang, bersifat anisotrop.
Hematit (Fe_2O_3)	35 %	Berwarna hitam hingga abu-abu perak, disseminated berbutir kasar hingga halus, ukuran mineral 0,1 mm – 0,2 mm, pleokrisme lemah, berbentuk subhedral, belahan sedang, bersifat isotrop.
Goetit ($\text{FeO}(\text{OH})$)	35 %	Berwarna merah gelap, disseminated berbutir kasar hingga halus, ukuran mineral 1 mm, pleokrisme lemah, berbentuk subhedral, belahan buruk, bersifat anisotrop.
Mineral Pengotor	20 %	Berwarna putih ke abu-abuan, hadir dalam bentuk sebaran, Sebagian besar hadir sebagai massa dasar dan membentuk anhedral.



Gambar 1. Fotomikrograf Sayatan Poles Sampel *Stockpile 1*

Nomor : 02		No. Sampel : ST-2B
Lokasi : <i>Stockpile 2</i>		Nama Batuan : Bijih Besi
Tipe Struktur (<i>Structure Of Type</i>) : <i>Desseminated</i>		
Tipe Endapan : <i>Skarn</i>		
Deskripsi (<i>Description</i>) : Kenampakan mineral-mineral logam hadir dalam bentuk tersebar disseminated pada sampel bijih besi. Kenampakan dalam sayatan poles memperlihatkan kehadiran mineral logam yaitu kalkopirit, hematit dan goetit dan sedikit terdapat massa dasar batuan berupa mineral pengotor.		
Komposisi Mineral (<i>Composition Of Mineral</i>)	Jumlah Amount (100%)	Keterangan Optik Mineral (<i>Description Of Optical Mineralogy</i>)
Kalkopirit (CuFeS_2)	35 %	Berwarna kuning, disseminated berbutir kasar hingga halus, ukuran mineral 0,5 mm – 1 mm, pleokrisme lemah, berbentuk subhedral, belahan buruk, bersifat anisotrop.
Hematit (Fe_2O_3)	25 %	Berwarna hitam hingga abu-abu perak, disseminated berbutir kasar hingga halus, ukuran mineral 0,2 mm – 0,3 mm, pleokrisme lemah, berbentuk subhedral, belahan buruk, bersifat isotrop.
Goetit ($\text{FeO}(\text{OH})$)	30 %	Berwarna merah gelap, disseminated berbutir kasar hingga halus, ukuran mineral 0,5 mm – 1 mm, pleokrisme lemah, berbentuk subhedral, belahan buruk, bersifat anisotrop.
Mineral Pengotor	10 %	Berwarna putih ke abu-abuan, hadir dalam bentuk sebaran, Sebagian besar hadir sebagai massa dasar dan membentuk anhedral.



Gambar 2. Fotomikrograf Sayatan Poles Sampel *Stockpile 2*

LAMPIRAN 3
ANALISIS *X-RAY*
***DIFFRACTION* (XRD)**

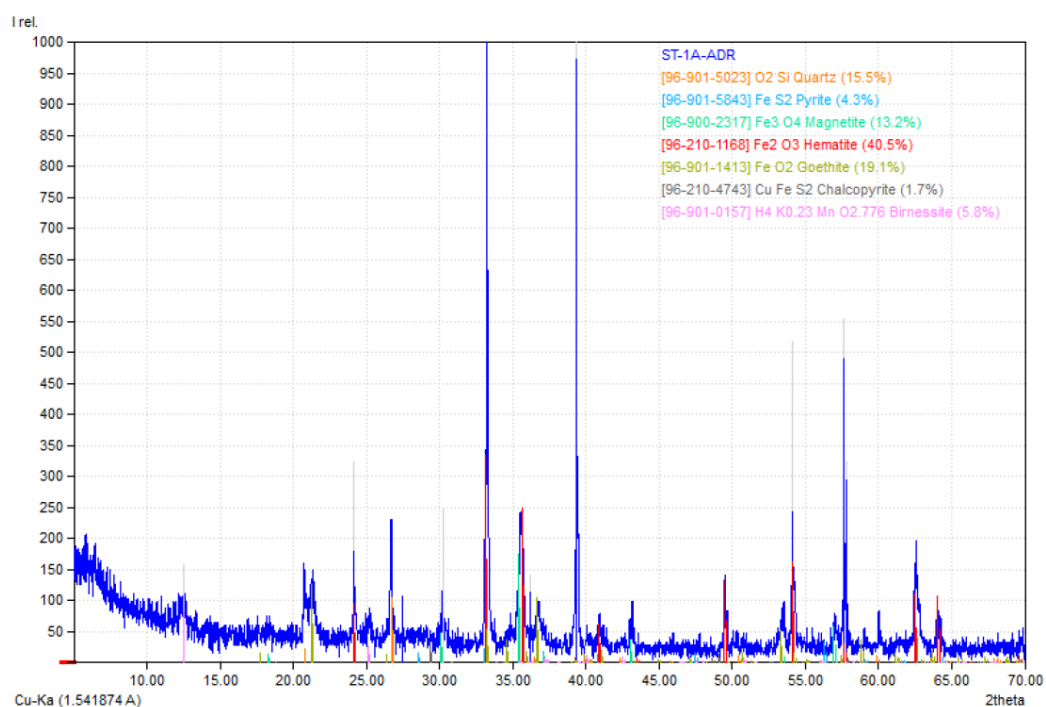
Match! Phase Analysis Report

Sample: ST-1A

Index	Amount %	Name	Formula Sum
A	40.5	Hematite	Fe ₂ O ₃
B	13.2	Magnetite	Fe ₃ O ₄
C	19.1	Goethite	FeO ₂
D	4.3	Pyrite	FeS ₂
E	15.5	Quartz	O ₂ Si
F	1.7	Chalcopyrite	CuFeS ₂
G	5.8	Birnessite	H4 K0.23 Mn O ₂ .776

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	12.50	7.0756	158.13	2.17	0.0800	G
2	24.12	3.6868	324.19	2.23	0.0400	D
3	27.48	3.2431	106.42	2.19	0.1200	A
4	30.22	2.9550	249.94	3.43	0.0800	B,C
5	36.20	2.4794	141.88	1.95	0.0800	A,E,G
6	39.38	2.2862	1000.00	41.22	0.2400	B,D,E,F,G
7	54.10	1.6938	518.07	10.68	0.1200	D,E
8	57.64	1.5979	554.88	11.44	0.1200	D,E,G
9	57.84	1.5929	324.45	6.69	0.1200	D,F,G



Match! Phase Analysis Report

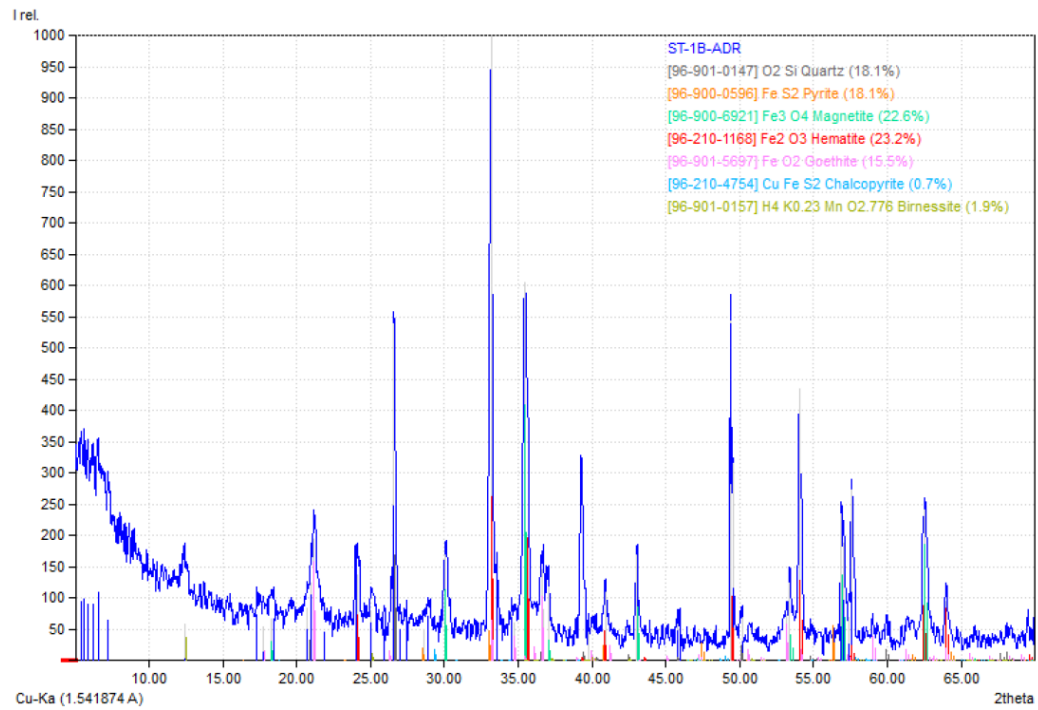
Sample: ST-1B

Index	Amount %	Name	Formula Sum
A	23.2	Hematite	Fe ₂ O ₃
B	22.6	Magnetite	Fe ₃ O ₄
C	15.5	Goethite	FeO ₂
D	18.1	Pyrite	FeS ₂
E	18.1	Quartz	O ₂ Si
F	0.7	Chalcopyrite	CuFeS ₂
G	1.9	Birnessite	H4 K0.23 Mn O ₂ .776

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.38	16.4266	94.32	1.72	0.0800	
2	5.62	15.7257	98.87	1.80	0.0800	
3	5.86	15.0821	89.45	0.81	0.0400	
4	6.18	14.3019	90.31	0.82	0.0400	
5	6.54	13.5154	108.72	0.99	0.0400	
6	7.20	12.2779	65.47	1.19	0.0800	
7	12.38	7.1498	58.24	1.59	0.1200	G
8	17.30	5.1260	73.29	2.67	0.1600	
9	17.72	5.0054	54.01	1.47	0.1200	E
10	18.28	4.8533	67.33	1.84	0.1200	C
11	18.44	4.8116	67.16	1.22	0.0800	
12	20.70	4.2911	84.16	8.42	0.4400	A
13	21.00	4.2304	124.07	2.26	0.0800	A
14	21.16	4.1988	194.15	10.60	0.2400	E
15	21.86	4.0659	44.86	0.41	0.0400	
16	23.98	3.7110	153.07	4.18	0.1200	
17	24.12	3.6898	137.76	11.28	0.3600	D
18	25.04	3.5563	80.23	5.11	0.2800	G
19	25.92	3.4375	50.31	0.46	0.0400	
20	26.58	3.3537	539.16	9.81	0.0800	A,E
21	26.96	3.3072	50.71	0.46	0.0400	
22	27.44	3.2505	58.23	1.06	0.0800	
23	28.58	3.1234	47.06	0.43	0.0400	B
24	28.88	3.0916	71.57	1.95	0.1200	
25	30.08	2.9709	168.89	12.29	0.3200	C
26	33.16	2.7017	1000.00	27.29	0.1200	B,D,E
27	33.56	2.6704	145.56	5.30	0.1600	
28	34.56	2.5954	73.12	2.00	0.1200	F
29	34.76	2.5809	61.43	11.74	0.8400	E
30	35.48	2.5302	604.48	60.49	0.4400	C,D,E,G
31	36.58	2.4566	144.95	9.23	0.2800	A,E,G
32	36.72	2.4475	82.40	1.50	0.0800	E
33	37.04	2.4271	118.53	1.08	0.0400	B,C,G
34	39.76	2.2671	46.14	0.42	0.0400	A,E,G
35	40.90	2.2065	110.55	1.01	0.0400	B,D,E
36	43.04	2.1016	168.93	4.61	0.1200	C,E
37	45.82	1.9804	58.74	1.07	0.0800	A
38	45.96	1.9747	54.98	1.00	0.0800	
39	49.38	1.8456	544.59	4.95	0.0400	F
40	49.40	1.8449	282.50	2.57	0.0400	D
41	49.54	1.8400	316.42	5.76	0.0800	D
42	50.16	1.8187	69.72	1.27	0.0800	A,E

43	53.18	1.7224	72.65	2.64	0.1600	E
44	53.38	1.7164	123.91	3.38	0.1200	B,C,E
45	54.04	1.6970	434.22	11.85	0.1200	D,E
46	56.88	1.6188	235.32	6.42	0.1200	C
47	57.04	1.6146	188.73	8.59	0.2000	A,C
48	57.38	1.6059	69.66	0.63	0.0400	A,D,E
49	57.58	1.6008	274.10	12.47	0.2000	D,E,F,G
50	62.54	1.4852	241.91	22.01	0.4000	C,D
51	63.98	1.4552	93.69	0.85	0.0400	A,D,E,F,G



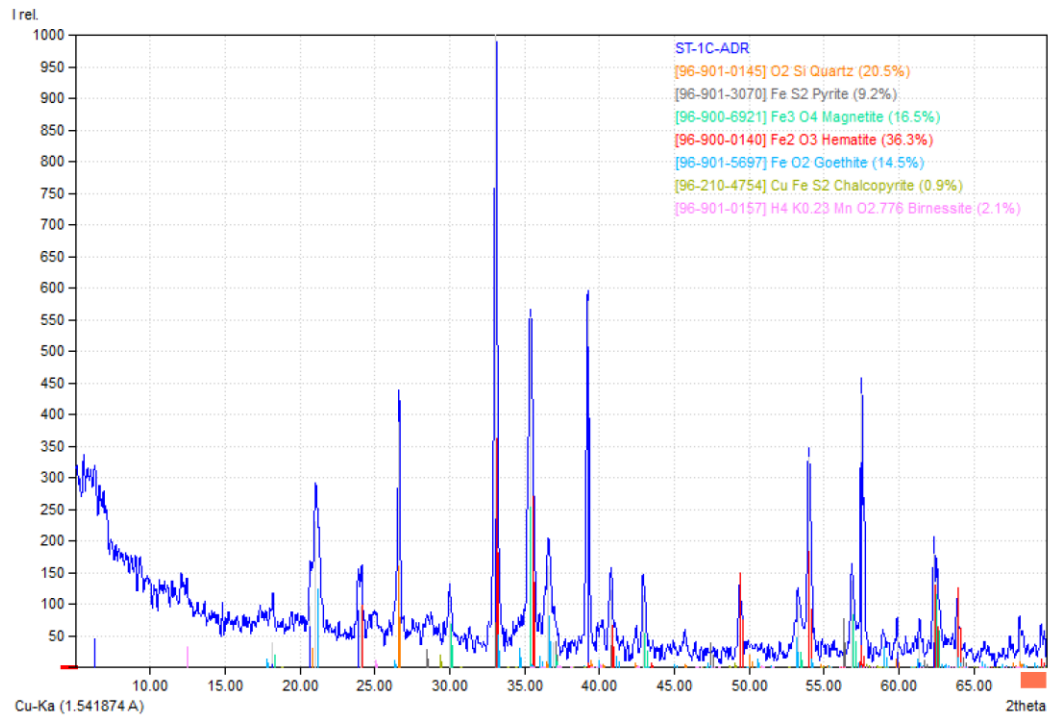
Match! Phase Analysis Report

Sample: ST-1C

Index	Amount %	Name	Formula Sum
A	36.3	Hematite	Fe ₂ O ₃
B	16.5	Magnetite	Fe ₃ O ₄
C	14.5	Goethite	FeO ₂
D	9.2	Pyrite	FeS ₂
E	20.5	Quartz	O ₂ Si
F	0.9	Chalcopyrite	CuFeS ₂
G	2.1	Birnessite	H4 K0.23 Mn O _{2.776}

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	6.29	14.0520	45.41	0.43	0.0400	
2	18.19	4.8771	40.19	1.14	0.1200	C
3	20.69	4.2931	97.80	3.70	0.1600	A
4	21.05	4.2205	230.94	6.55	0.1200	A,E
5	23.91	3.7218	89.56	0.85	0.0400	
6	24.11	3.6913	96.75	4.57	0.2000	D
7	26.63	3.3475	389.08	7.36	0.0800	A,E
8	29.99	2.9796	70.42	2.66	0.1600	C
9	33.09	2.7072	1000.00	56.72	0.2400	B,D,E
10	35.39	2.5364	553.61	52.33	0.4000	C,D,E,G
11	36.59	2.4559	159.58	7.54	0.2000	A,E,G
12	36.95	2.4328	40.28	0.38	0.0400	B,C,G
13	39.23	2.2965	579.88	21.93	0.1600	A,D,E,F,G
14	40.77	2.2133	121.47	4.59	0.1600	B,D
15	42.91	2.1077	114.50	1.08	0.0400	C,E,G
16	49.37	1.8460	109.59	2.07	0.0800	D,F
17	53.23	1.7209	98.02	0.93	0.0400	C,E
18	53.97	1.6990	333.23	15.75	0.2000	D,E
19	56.85	1.6196	136.67	5.17	0.1600	A,C
20	57.49	1.6031	432.62	8.18	0.0800	A,D,E,G
21	59.89	1.5444	47.32	0.45	0.0400	A
22	61.37	1.5107	46.85	0.44	0.0400	E,F,G
23	62.33	1.4897	179.13	5.08	0.1200	D
24	62.53	1.4854	140.96	6.66	0.2000	C,D
25	63.87	1.4575	79.70	1.51	0.0800	A,D,E,F,G
26	68.05	1.3778	59.99	1.13	0.0800	A,E,G



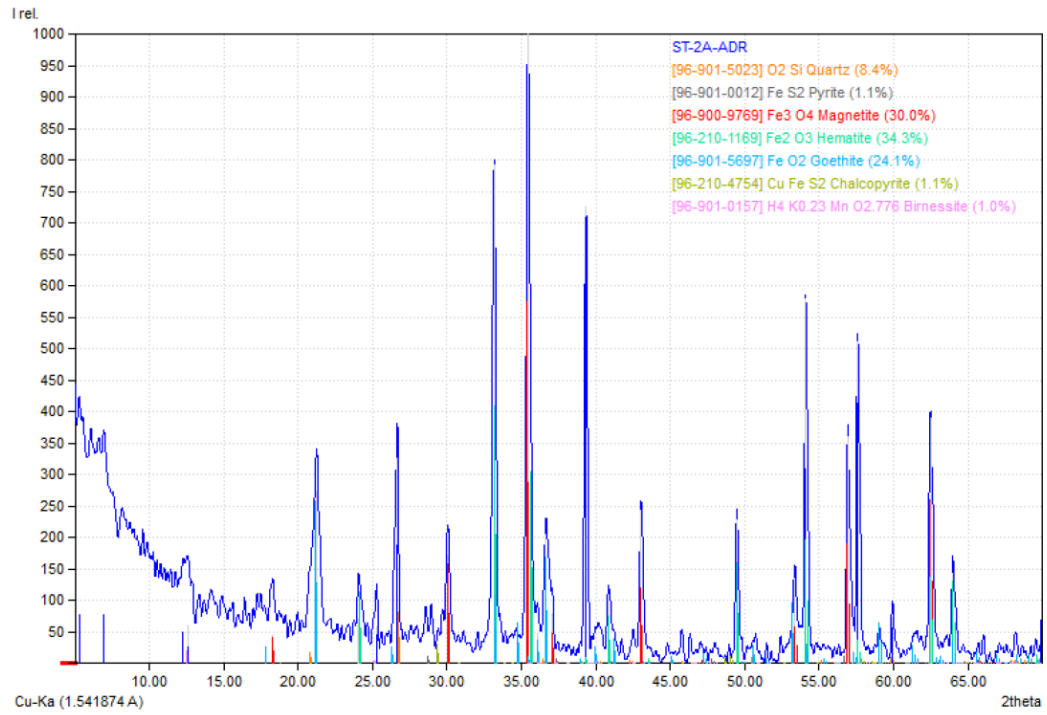
Match! Phase Analysis Report

Sample: ST-2A

Index	Amount %	Name	Formula Sum
A	34.5	Hematite	Fe ₂ O ₃
B	30.0	Magnetite	Fe ₃ O ₄
C	24.1	Goethite	FeO ₂
D	1.1	Pyrite	FeS ₂
E	8.4	Quartz	O ₂ Si
F	1.1	Chalcopyrite	CuFeS ₂
G	1.0	Birnessite	H4 K0.23 Mn O ₂ .776

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.30	16.6744	78.10	0.58	0.0400	
2	6.94	12.7373	78.57	0.58	0.0400	
3	12.26	7.2195	50.97	0.38	0.0400	
4	12.62	7.0144	60.49	0.45	0.0400	G
5	18.30	4.8481	46.44	1.37	0.1600	C
6	21.24	4.1832	272.64	14.10	0.2800	E
7	24.06	3.6989	71.80	0.53	0.0400	D
8	25.28	3.5231	57.55	0.43	0.0400	G
9	26.66	3.3438	325.96	4.82	0.0800	A,E
10	30.06	2.9729	172.07	7.63	0.2400	C
11	33.18	2.7001	792.59	41.00	0.2800	B,D,E
12	35.44	2.5329	1000.00	44.34	0.2400	C,D,E,G
13	36.06	2.4908	48.83	1.08	0.1200	E,G
14	36.66	2.4514	205.28	9.10	0.2400	A,E,G
15	37.08	2.4246	80.79	2.39	0.1600	B,C,G
16	39.34	2.2904	726.68	32.22	0.2400	D,E,F,G
17	40.84	2.2096	98.94	0.73	0.0400	B,D
18	43.04	2.1016	242.97	3.59	0.0800	C,E
19	49.48	1.8421	229.10	8.47	0.2000	D
20	53.38	1.7164	134.15	1.98	0.0800	C,E
21	54.10	1.6952	579.44	12.85	0.1200	D,E
22	56.92	1.6178	360.39	7.99	0.1200	A,B,C
23	57.58	1.6008	512.25	7.57	0.0800	D,E,F,G
24	59.92	1.5437	73.60	0.54	0.0400	A,B
25	62.48	1.4865	390.04	14.41	0.2000	B,C,D
26	63.98	1.4552	143.67	3.19	0.1200	D,E,F,G



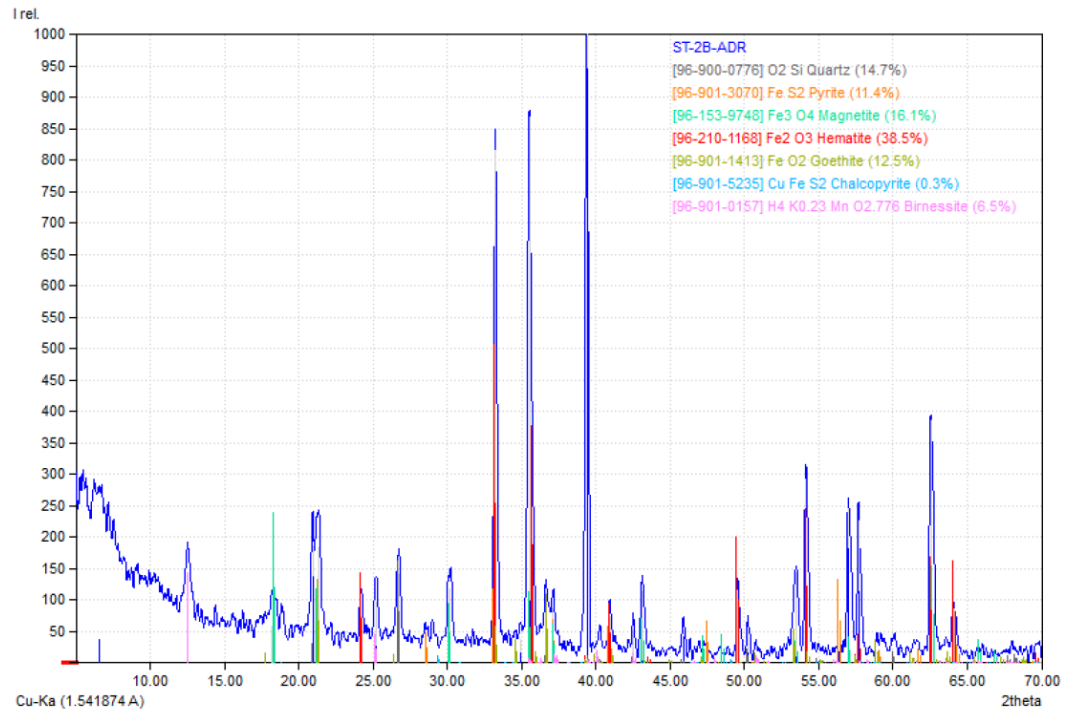
Match! Phase Analysis Report

Sample: ST-2B

Index	Amount %	Name	Formula Sum
A	38.5	Hematite	Fe ₂ O ₃
B	16.1	Magnetite	Fe ₃ O ₄
C	12.5	Goethite	FeO ₂
D	11.4	Pyrite	FeS ₂
E	14.7	Quartz	O ₂ Si
F	0.3	Chalcopyrite	CuFeS ₂
G	6.5	Birnessite	H4 K0.23 Mn O _{2.776}

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	6.56	13.4743	37.49	4.98	0.5200	
2	12.52	7.0702	106.72	9.82	0.3600	G
3	18.22	4.8692	58.61	5.39	0.3600	C
4	20.94	4.2424	186.45	13.34	0.2800	A
5	21.32	4.1677	183.23	14.99	0.3200	C,E
6	24.20	3.6778	73.55	5.26	0.2800	D
7	25.20	3.5341	96.59	6.91	0.2800	G
8	26.74	3.3339	141.47	8.68	0.2400	A
9	30.20	2.9594	118.17	7.25	0.2400	C
10	33.24	2.6954	815.54	41.69	0.2000	B,D,E
11	34.92	2.5694	36.90	2.64	0.2800	E
12	35.52	2.5274	870.10	62.27	0.2800	C,D,E,G
13	36.64	2.4527	102.12	7.31	0.2800	A,E,G
14	37.12	2.4221	87.00	5.34	0.2400	B,C,G
15	39.40	2.2870	1000.00	71.56	0.2800	A,D,E,G
16	40.94	2.2045	74.40	3.80	0.2000	B,D,E
17	42.50	2.1271	52.72	2.69	0.2000	A,G
18	43.12	2.0979	114.84	8.22	0.2800	C,E
19	45.88	1.9779	52.85	2.70	0.2000	A
20	49.56	1.8394	115.98	5.93	0.2000	D,E
21	50.24	1.8160	54.49	2.79	0.2000	A,B
22	53.48	1.7134	143.89	13.24	0.3600	C,E
23	54.14	1.6941	292.03	14.93	0.2000	D,E
24	57.00	1.6157	246.20	15.10	0.2400	A,C
25	57.68	1.5982	227.64	11.64	0.2000	D,E,F,G
26	62.54	1.4852	386.74	23.72	0.2400	C,D
27	64.06	1.4536	86.37	5.30	0.2400	A,B,D,E,F,G



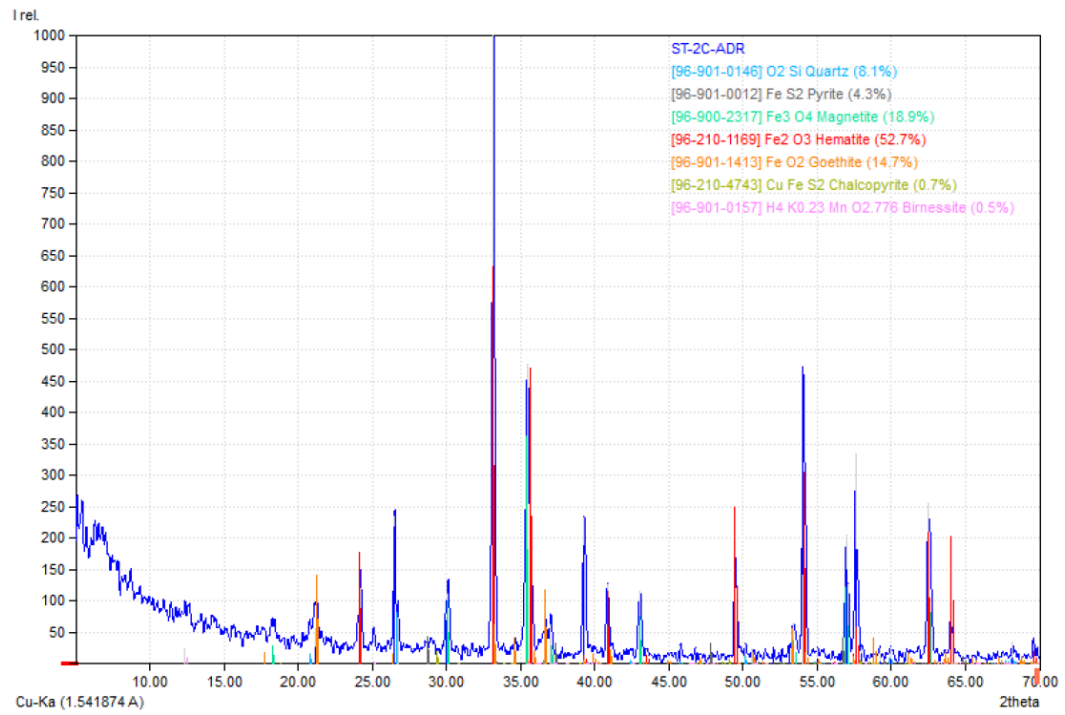
Match! Phase Analysis Report

Sample: ST-2C

Index	Amount %	Name	Formula Sum
A	52.7	Hematite	Fe ₂ O ₃
B	18.9	Magnetite	Fe ₃ O ₄
C	14.7	Goethite	FeO ₂
D	4.3	Pyrite	FeS ₂
E	8.1	Quartz	O ₂ Si
F	0.7	Chalcopyrite	CuFeS ₂
G	0.5	Birnessite	H4 K0.23 Mn O ₂ .776

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	12.38	7.1498	24.04	0.31	0.0400	G
2	21.12	4.2067	57.03	0.73	0.0400	A
3	21.26	4.1793	63.70	1.64	0.0800	E
4	24.22	3.6748	120.42	1.55	0.0400	D
5	26.50	3.3636	235.41	3.03	0.0400	E
6	26.72	3.3364	73.44	1.89	0.0800	A
7	29.96	2.9826	69.40	0.89	0.0400	
8	30.10	2.9690	112.25	2.89	0.0800	C
9	33.16	2.7017	1000.00	38.59	0.1200	B,D,E
10	35.46	2.5315	476.95	36.81	0.2400	C,D,E,G
11	36.70	2.4488	55.66	1.43	0.0800	A,E
12	37.00	2.4296	63.51	1.63	0.0800	C,G
13	39.28	2.2937	233.15	18.00	0.2400	A,D,E,F,G
14	40.86	2.2086	126.96	8.17	0.2000	B,D,E
15	43.06	2.1007	116.58	7.50	0.2000	C,E
16	45.78	1.9820	29.44	0.38	0.0400	A
17	46.80	1.9412	24.60	0.32	0.0400	E,F,G
18	49.46	1.8428	183.87	7.10	0.1200	D,E,F
19	50.18	1.8181	29.84	0.38	0.0400	A
20	50.60	1.8040	24.32	0.63	0.0800	A,B,E,G
21	52.06	1.7568	24.55	0.32	0.0400	
22	52.60	1.7400	24.28	0.62	0.0800	F
23	53.08	1.7254	28.07	1.08	0.1200	
24	53.36	1.7170	64.28	4.13	0.2000	C,E
25	54.04	1.6970	473.17	12.17	0.0800	
26	54.06	1.6964	141.58	3.64	0.0800	D,E
27	55.04	1.6685	25.06	0.97	0.1200	A,E,F
28	56.96	1.6167	205.20	5.28	0.0800	B,C
29	57.12	1.6126	127.23	3.27	0.0800	A,C
30	57.60	1.6003	334.09	8.60	0.0800	D,E,G
31	57.98	1.5907	27.46	0.35	0.0400	F,G
32	59.22	1.5603	25.08	0.65	0.0800	B,E,F
33	59.96	1.5428	25.91	0.33	0.0400	A
34	62.48	1.4865	256.58	16.50	0.2000	B,C,D
35	64.00	1.4548	73.34	2.83	0.1200	A,D,E,F,G
36	68.16	1.3758	34.85	1.79	0.1600	A,E,G
37	69.60	1.3508	29.86	0.38	0.0400	B,D,E,F,G



LAMPIRAN 4

ANALISIS ICP-MS DAN

ANALISIS ICP-OES

MINERALS TEST REPORT

CLIENT

Andri Saputra
BTN Tontouan No. 22
RT.000/RW.000, Tontouan
Luwuk
Sulawesi Tengah 94711
Indonesia

JOB INFORMATION

Job Number : 223376
Customer Ref : F4847
Number of samples : 4
Report Comprising : Cover Sheet, Scheme Description, Results
Total Pages : 20
Date received : 05/09/2022
Date reported : 21/09/2022
Notes : N.A = Not Analyzed
I.S = Insufficient Sample
L.N.R = Listed Not Received
R.N.L = Received Not Listed

REPORT NOTES**TESTED BY**

PT Intertek Utama Services
Jl. Raya Bogor KM 28
Jakarta Timur - Indonesia 13710
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Fax : +6221 2938 4465
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Approved Signature for:

Scott Sloane
Minerals Manager

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SCHEME DESCRIPTION

Ref : F4847

Job : 223376

Scheme code: 4A/OE

ICP-OES Determination 4 acid digest in teflon tube

Scheme code: 4A/MS

ICP-MS Determination 4 acid digest in teflon tube

Scheme code: 4A/MS11

ICP-MS Determination 4 acid digest in teflon tube

Scheme code: FB1/XRF250

1

XRF whole rock analysis. Samples fused using Lithium Metaborate and analysed by XRF. XRF analysis determines total element concentrations which are reported as oxides.

Scheme code: LOI

Loss of ignition

FINAL REPORT

Ref: F4847

Job : 223376

SAMPLE	Al	Ca	Cr	Cu	Fe	K	Mg	Mn	Na
ST 1A ADR	16700	6400	18	589	>50	2700	3150	948	510
ST 2A ADR	6040	4510	11	164	49.7	1310	1060	495	590
ST 1C ADR	17500	4010	23	595	47.8	3160	3120	720	650
ST 2C ADR	5500	3770	10	353	48.4	1200	910	437	530
UNITS	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
DET LIM	50	50	5	1	0.01	20	20	1	20
SCHEME	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE

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Job Number: 223376

Client Ref: F4847

FINAL REPORT

Ref : F4847

Job : 223376

SAMPLE	Ni	P	S	Sc	Ti	V	Zn	Ag	As
ST 1A ADR	27	540	1470	4	688	164	135	0.6	13
ST 2A ADR	8	400	3600	2	280	85	88	0.6	10
ST 1C ADR	24	580	1560	4	703	168	128	0.7	10
ST 2C ADR	7	220	2250	2	244	65	71	1.2	7
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DET LIM	1	50	50	1	5	1	1	0.1	1
SCHEME	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

FINAL REPORT

Ref: F4847

Job: 223376

SAMPLE	Ba	Be	Bi	Cd	Co	Cs	Ga	Ge	Hf
ST 1A ADR	46	0.7	1.83	0.06	87	0.5	11.1	1.4	0.4
ST 2A ADR	13	<0.5	2.73	<0.05	29	0.1	7.7	1.5	0.5
ST 1C ADR	43	0.6	1.18	0.05	85	0.6	10.1	1.7	0.4
ST 2C ADR	12	0.6	1.22	<0.05	27	0.1	8.2	1.8	<0.1
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DET LIM	1	0.5	0.05	0.05	1	0.1	0.1	0.1	0.1
SCHEME	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

FINAL REPORT

Ref : F4847

Job : 223376

SAMPLE	In	Li	Mo	Nb	Pb	Rb	Re	Sb	Se
ST 1A ADR	0.26	4.2	3.3	3.0	25	11.6	<0.05	0.8	3
ST 2A ADR	0.18	2.3	2.6	3.4	25	4.3	<0.05	0.5	5
ST 1C ADR	0.25	3.7	3.1	2.6	26	15.7	<0.05	0.7	3
ST 2C ADR	0.26	2.4	4.2	1.5	42	3.8	<0.05	0.5	3
UNITS DET LIM SCHEME	ppm 0.05 4A/MS	ppm 0.1 4A/MS	ppm 0.1 4A/MS	ppm 0.1 4A/MS	ppm 1 4A/MS	ppm 0.1 4A/MS	ppm 0.05 4A/MS	ppm 0.1 4A/MS	ppm 1 4A/MS

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Job Number: 223376

Client Ref: F4847

FINAL REPORT

Ref: F4847

Job : 223376

SAMPLE	Sn	Sr	Ta	Te	Th	Tl	U	W	Y
ST 1A ADR	5.6	18.0	0.66	0.8	1.60	0.05	2.22	35.7	6.6
ST 2A ADR	4.1	3.4	0.82	1.2	1.07	0.03	1.03	39.0	4.1
ST 1C ADR	5.5	17.7	0.53	0.5	0.74	0.08	2.04	40.0	6.1
ST 2C ADR	5.3	1.1	0.22	0.9	<0.05	0.03	0.96	82.7	6.9
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DET LIM	0.1	0.5	0.05	0.1	0.05	0.02	0.05	0.1	0.1
SCHEME	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

Client Ref: F4847

FINAL REPORT

Ref : F4847

Job : 223376

SAMPLE	Nd	Pr	Sm	Tb	Tm	Yb	Al ₂ O ₃	CaO	Cr ₂ O ₃
ST 1A ADR	5.3	1.41	1.3	0.17	<0.1	0.7	3.14	0.93	<0.01
ST 2A ADR	2.2	0.55	0.5	0.10	<0.1	0.4	1.12	0.65	<0.01
ST 1C ADR	4.7	1.15	1.0	0.16	<0.1	0.5	3.40	0.60	<0.01
ST 2C ADR	2.3	0.60	0.6	0.15	0.1	0.6	1.03	0.55	<0.01
UNITS	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%
DET LIM	0.1	0.05	0.1	0.05	0.1	0.1	0.01	0.01	0.01
SCHEME	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	FB1/XRF250	FB1/XRF250	FB1/XRF250

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Job Number: 223376

Client Ref: F4847

Ref : F4847

Job : 223376

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Client Ref: F4847

FINAL REPORT

Ref: F4847

Job : 223376

SAMPLE	Total	LOI							
ST 1A ADR	99.3	2.16							
ST 2A ADR	99.4	1.85							
ST 1C ADR	100.0	2.59							
ST 2C ADR	99.1	0.73							
		</							

QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Al	Ca	Cr	Cu	Fe	K	Mg	Mn	Na
BLK BLANK	<50	<50	5	1	<0.01	<20	<20	<1	20
REP ST 2C ADR	5610	3830	9	361	48.4	1220	940	442	570
UNK ST 2C ADR	5500	3770	10	353	48.4	1200	910	437	530
STD GBM397-7	51800	54400	1280	698	5.41	7490	24200	966	7950
Lower Bound				618.3					
Upper Bound				755.7					
STD NI_LTRT11					43.9				
Lower Bound					39.465				
Upper Bound					48.235				
STD NI_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 504B	69700	27800	72	11300	7.35	29800	16700	539	20900
Lower Bound	62190	24660	56	9990	6.6	26370	14940	486	18180
Upper Bound	76010	30140	84	12210	8.06	32230	18260	594	22220
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm	ppm
DETECTION LIMIT	50	50	5	1	0.01	20	20	1	20
SCHEME	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE

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Job Number: 223376

Client Ref: F4847

QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Ni	P	S	Sc	Ti	V	Zn	Ag	As
BLK BLANK	1	<50	<50	<1	5	<1	1	<0.1	<1
REP ST 2C ADR	6	230	2330	2	235	61	70	1.2	7
UNK ST 2C ADR	7	220	2250	2	244	65	71	1.2	7
STD GBM397-7	239	250	8880	18	2640	128	812	3	758
Lower Bound	218.7						720.9	2.79	
Upper Bound	267.3						881.1	3.41	
STD NI_LTRT11									
Lower Bound									
Upper Bound									
STD NI_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 5048	35	940	12900	15	3680	146	116	3	10
Lower Bound	29.325		11790	11.6	3094	119.2	86.4	2.46	8.24
Upper Bound	39.675		14410	17.4	4186	178.8	129.6	3.68	12.36
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	1	50	50	1	5	1	1	0.1	1
SCHEME	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/OE	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Ba	Be	Bi	Cd	Co	Cs	Ga	Ge	Hf
BLK BLANK	<1	<0.5	<0.05	<0.05	<1	<0.1	<0.1	<0.1	<0.1
REP ST 2C ADR	13	0.6	1.25	<0.05	27	0.1	8.3	1.9	<0.1
UNK ST 2C ADR	12	0.6	1.22	<0.05	27	0.1	8.2	1.8	<0.1
STD GBM397-7	249	0.7	3.74	2.5	55	2.3	12.1	1.3	1.4
Lower Bound									
Upper Bound									
STD NI_LTRT11									
Lower Bound									
Upper Bound									
STD NI_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 504B	718	1.6	4.9	0.32	21	5	16.5	1.8	1.9
Lower Bound	639.9	1.18	3.69	0.33	17.765	4.02	13.36		1.36
Upper Bound	782.1	1.96	6.15	0.49	24.035	6.04	20.04		2.28
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	1	0.5	0.05	0.05	1	0.1	0.1	0.1	0.1
SCHEME	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	In	Li	Mo	Nb	Pb	Rb	Re	Sb	Se
BLK BLANK	<0.05	<0.1	<0.1	<0.1	<1	<0.1	<0.05	<0.1	<1
REP ST 2C ADR	0.27	2.5	4.1	1.6	43	3.6	<0.05	0.5	3
UNK ST 2C ADR	0.26	2.4	4.2	1.5	42	3.8	<0.05	0.5	3
STD GBM397-7	0.23	24	9.2	2.7	921	33.8	<0.05	30.2	1
Lower Bound					817.2				
Upper Bound					998.8				
STD NL_LTRT11									
Lower Bound									
Upper Bound									
STD NL_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 5048	0.75	22.7	503	10.2	25	105	<0.05	1.2	12
Lower Bound	0.51	18.64	449.1	8	20.96	90.1	0	0.83	9.3
Upper Bound	0.95	27.96	548.9	12	31.44	121.9	0.02	1.55	15.5
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	0.05	0.1	0.1	0.1	1	0.1	0.05	0.1	1
SCHEME	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS

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Job Number: 223376

Client Ref: F4847

QUALITY CONTROL

Ref: F4847

Job : 223376

SAMPLE	Sn	Sr	Ta	Te	Th	Tl	U	W	Y
BLK BLANK	<0.1	<0.5	<0.05	<0.1	<0.05	<0.02	<0.05	0.1	<0.1
REP ST 2C ADR	5.4	1.4	0.25	1.1	<0.05	0.03	1	83.1	6.8
UNK ST 2C ADR	5.3	1.1	0.22	0.9	<0.05	0.03	0.96	82.7	6.9
STD GBM397-7	3	85.7	0.5	0.8	3.24	0.32	1	38.7	12.3
Lower Bound									
Upper Bound									
STD NI_LTRT11									
Lower Bound									
Upper Bound									
STD NI_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 5048	11.1	423	0.68	0.4	8.15	0.47	2.31	3.2	17.6
Lower Bound	9.12	317.2	0.17	0.19	6.2	0.34	1.75	2.35	14.16
Upper Bound	13.68	528.8	1.19	0.57	10.34	0.64	2.91	3.91	21.24
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	0.1	0.5	0.05	0.1	0.05	0.02	0.05	0.1	0.1
SCHEME	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS	4A/MS

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QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Zr	Ce	Dy	Er	Eu	Gd	Ho	La	Lu
BLK BLANK	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.05
REP ST 2C ADR	5.1	4.6	1	0.7	0.2	0.8	0.2	2.6	0.1
UNK ST 2C ADR	5.6	5	1	0.6	0.2	0.8	0.2	2.8	0.09
STD GBM397-7	52.4	27.7	2.4	1.3	0.6	2.7	0.5	14.6	0.19
Lower Bound									
Upper Bound									
STD NI_LTRT11									
Lower Bound									
Upper Bound									
STD NI_LTRT42									
Lower Bound									
Upper Bound									
STD OREAS 5048	61.6	38.6	3.3	1.8	1	3.5	0.7	19.5	0.28
Lower Bound	48	32.81	2.47	1.27	0.66	2.6	0.46	15.68	0.2
Upper Bound	72	44.39	4.11	2.37	1.23	4.32	0.84	23.52	0.36
STD SCH-1									
Lower Bound									
Upper Bound									

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
DETECTION LIMIT	0.5	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.05
SCHEME	4A/MS	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11

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QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Nd	Pr	Sm	Tb	Tm	Yb	Al2O3	CaO	Cr2O3
BLK BLANK	<0.1	<0.05	<0.1	<0.05	<0.1	<0.1	<0.01	<0.01	<0.01
REP ST 2C ADR	2.3	0.57	0.6	0.15	0.1	0.6	1.02	0.55	<0.01
UNK ST 2C ADR	2.3	0.6	0.6	0.15	0.1	0.6	1.03	0.55	<0.01
STD GBM397-7	11.6	2.87	2.6	0.38	0.2	1.4			
Lower Bound									
Upper Bound									
STD NI_LTRT11									
Lower Bound									
Upper Bound									
STD NI_LTRT42							16.81	13.3	0.11
Lower Bound							16.646	13.114	0.08
Upper Bound							17.153	13.786	0.12
STD OREAS 504B	18	4.48	3.6	0.55	0.3	1.8			
Lower Bound	14.16	3.64	2.71		0.17	1.27			
Upper Bound	21.24	5.46	4.51		0.35	2.37			
STD SCH-1							0.95	0.04	
Lower Bound							0.94	0.03	
Upper Bound							0.98	0.05	

UNITS	ppm	ppm	ppm	ppm	ppm	ppm	%	%	%
DETECTION LIMIT	0.1	0.05	0.1	0.05	0.1	0.1	0.01	0.01	0.01
SCHEME	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	4A/MS11	FB1/XRF250	FB1/XRF250	FB1/XRF250

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QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	S
BLK BLANK	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	<0.01	<0.01	<0.002
REP ST 2C ADR	88.66	0.14	0.16	0.06	0.06	0.054	7.69	0.05	0.211
UNK ST 2C ADR	88.38	0.14	0.16	0.06	0.07	0.054	7.65	0.06	0.212
STD GBM397-7									
Lower Bound									
Upper Bound									
STD NL_LTR711									
Lower Bound									
Upper Bound									
STD NL_LTR742	6.91	0.06	8.97	0.16	1.36	0.039	49.35	0.33	0.015
Lower Bound	6.76	0.04	8.87	0.15	1.27	0.01	49.154	0.31	0.00
Upper Bound	7.32	0.08	9.15	0.17	1.47	0.07	50.146	0.35	0.02
STD OREAS 501B									
Lower Bound									
Upper Bound									
STD SCH-1	86.91	0.03	0.03	1	0.02	0.125	8.04	0.04	
Lower Bound	86.406	0.02	0.02	1	0.02	0.11	7.98	0.04	
Upper Bound	87.274	0.04	0.04	1	0.04	0.13	8.2	0.06	

UNITS	%	%	%	%	%	%	%	%	%
DETECTION LIMIT	0.01	0.01	0.01	0.01	0.01	0.002	0.01	0.01	0.002
SCHEME	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250	FB1/XRF250

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QUALITY CONTROL

Ref : F4847

Job : 223376

SAMPLE	Total	LOI
BLK BLANK		
REP ST 2C ADR	99.5	0.79
UNK ST 2C ADR	99.1	0.73
STD GBM397-7		
Lower Bound		
Upper Bound		
STD NI_LTRT11		
Lower Bound		
Upper Bound		
STD NI_LTRT42	99.2	1.81
Lower Bound		1.56
Upper Bound		1.96
STD OREAS 5048		
Lower Bound		
Upper Bound		
STD SCH-1		
Lower Bound		
Upper Bound		

UNITS	%	%
DETECTION LIMIT	0	0.01
SCHEME	FB1/XRF250	LOI

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Job Number: 223376

Client Ref: F4847

LAMPIRAN 5

PENGUJIAN KINETIK *FREE*
DRAINING COLUMN LEACH
(FDCL)

Tabel 1. Hasil Uji kinetik (FDCL) Periode Harian

NO	Sampel	Sampel	Berat (gr)	Air (ml)	Air Lindi (ml)	pH	Suhu (°C)
1	6/9/2022	ST-1A	300	200	110	3,2	26,6
2		ST-1B	300	200	120	2,8	25,3
3		ST-1C	300	200	120	3,0	27
4		ST-2A	300	200	125	3,1	25,7
5		ST-2B	300	200	110	2,1	26
6	8/12/2022	ST-2C	300	200	130	3,1	27
7	7/9/2022	ST-1A	300	200	175	2,7	25,7
8		ST-1B	300	200	130	2,9	25
9		ST-1C	300	200	170	3,0	25,1
10		ST-2A	300	200	140	2,5	25,9
11		ST-2B	300	200	155	2,2	25,3
12	9/12/2022	ST-2C	300	200	130	3,3	26
13	8/9/2022	ST-1A	300	200	130	2,8	25,1
14		ST-1B	300	200	180	3,1	25
15		ST-1C	300	200	180	2,7	25
16		ST-2A	300	200	175	2,4	25
17		ST-2B	300	200	170	2,9	25,4
18	10/12/2022	ST-2C	300	200	180	3,6	26
19	9/9/2022	ST-1A	300	200	150	3,9	25,1
20		ST-1B	300	200	160	3,5	25,6
21		ST-1C	300	200	170	3,7	25,5
22		ST-2A	300	200	155	2,9	25,4
23		ST-2B	300	200	150	2,6	25,5
24	11/12/2022	ST-2C	300	200	175	3,4	26
25	10/9/2022	ST-1A	300	200	155	3,5	25,3
26		ST-1B	300	200	130	3,3	25,3
27		ST-1C	300	200	120	3,6	25
28		ST-2A	300	200	175	3,0	25,5
29		ST-2B	300	200	125	2,7	25,3
30	12/12/2022	ST-2C	300	200	150	3,5	26
31	11/9/2022	ST-1A	300	200	130	3,5	25,8
32		ST-1B	300	200	175	3,3	25,6
33		ST-1C	300	200	130	3,6	25,5
34		ST-2A	300	200	180	3,0	25,4
35		ST-2B	300	200	140	2,7	25,6
36	13/12/2022	ST-2C	300	200	165	3,7	26
37	12/9/2022	ST-1A	300	200	150	3,4	25,3
38		ST-1B	300	200	150	3,6	25,4
39		ST-1C	300	200	180	3,8	25,3
40		ST-2A	300	200	160	3,1	25,7
41		ST-2B	300	200	150	2,8	25,6

NO	Sampel	Sampel	Berat (gr)	Air (ml)	Air Lindi (ml)	pH	Suhu (°C)
42	14/12/2022	ST-2C	300	200	155	3,5	26
43	13/9/2022	ST-1A	300	200	160	3,6	25,3
44		ST-1B	300	200	165	3,4	25,5
45		ST-1C	300	200	170	3,6	25,1
46		ST-2A	300	200	150	3,1	25,5
47		ST-2B	300	200	155	2,9	25
48	15/12/2022	ST-2C	300	200	175	3,9	26
49	14/9/2022	ST-1A	300	200	125	3,7	24,6
50		ST-1B	300	200	170	3,4	24,3
51		ST-1C	300	200	145	3,5	24,4
52		ST-2A	300	200	145	3,2	26,6
53		ST-2B	300	200	155	2,9	25
54	16/12/2022	ST-2C	300	200	185	3,6	26
55	15/9/2022	ST-1A	300	200	120	4,0	25,2
56		ST-1B	300	200	130	3,4	25,5
57		ST-1C	300	200	150	3,6	25,5
58		ST-2A	300	200	150	3,0	25,6
59		ST-2B	300	200	120	2,9	25,2
60	17/12/2022	ST-2C	300	200	180	3,9	27
61	16/9/2022	ST-1A	300	200	150	3,8	25,4
62		ST-1B	300	200	175	3,4	24,5
63		ST-1C	300	200	130	3,6	25,5
64		ST-2A	300	200	175	2,9	25,6
65		ST-2B	300	200	150	2,9	24,4
66	18/12/2022	ST-2C	300	200	185	3,8	27
67	17/9/2022	ST-1A	300	200	150	3,7	26,5
68		ST-1B	300	200	175	3,4	26,7
69		ST-1C	300	200	180	3,5	26,6
70		ST-2A	300	200	140	2,8	26,5
71		ST-2B	300	200	150	3,0	26,6
72	19/12/2022	ST-2C	300	200	175	3,8	27
73	18/9/2022	ST-1A	300	200	150	3,9	25
74		ST-1B	300	200	175	3,5	25,2
75		ST-1C	300	200	175	3,7	25,3
76		ST-2A	300	200	170	2,9	25,1
77		ST-2B	300	200	160	3,1	25,6
78	20/12/2022	ST-2C	300	200	160	3,7	27
79	19/9/2022	ST-1A	300	200	160	3,5	25,6
80		ST-1B	300	200	140	3,4	25,5
81		ST-1C	300	200	150	3,5	25,7
82		ST-2A	300	200	150	3,0	25,5
83		ST-2B	300	200	130	3,1	25,5
84	21/12/2022	ST-2C	300	200	190	3,8	26

Tabel 2. Hasil Uji kinetik (FDCL) Periode Mingguan

NO	Sampel	Sampel	Berat (gr)	Air (ml)	Air Lindi (ml)	pH	Suhu (°C)
1	27/9/2022	ST-1A	300	200	140	3,7	25,2
2		ST-1B	300	200	130	3,2	25,1
3		ST-1C	300	200	145	3,6	25
4		ST-2A	300	200	170	3,3	25
5		ST-2B	300	200	130	3,2	25
6	28/12/2022	ST-2C	300	200	150	3,7	26
7	4/10/2022	ST-1A	300	200	125	3,6	25
8		ST-1B	300	200	155	3,1	25
9		ST-1C	300	200	155	3,5	25
10		ST-2A	300	200	120	2,9	25,4
11		ST-2B	300	200	130	3,1	25,2
12	4/1/2022	ST-2C	300	200	130	3,6	26

Tabel 3. Hasil Uji kinetik (FDCL) Periode Bulanan

NO	Sampel	Sampel	Berat (gr)	Air (ml)	Air Lindi (ml)	pH	Suhu (°C)
1	4/11/2022	ST-1A	300	200	130	3,5	25,2
2		ST-1B	300	200	150	3,3	25
3		ST-1C	300	200	140	3,5	26,1
4		ST-2A	300	200	140	2,9	25,5
5		ST-2B	300	200	135	3,0	25,4
6	2/2/2022	ST-2C	300	200	160	3,8	25,3
7	6/12/2022	ST-1A	300	200	140	3,4	25
8		ST-1B	300	200	155	3,3	26,3
9		ST-1C	300	200	130	3,4	25,2
10		ST-2A	300	200	135	2,7	25,5
11		ST-2B	300	200	150	2,9	26,1
12	2/3/2022	ST-2C	300	200	125	3,6	25