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LAMPIRAN

LAMPIRAN A

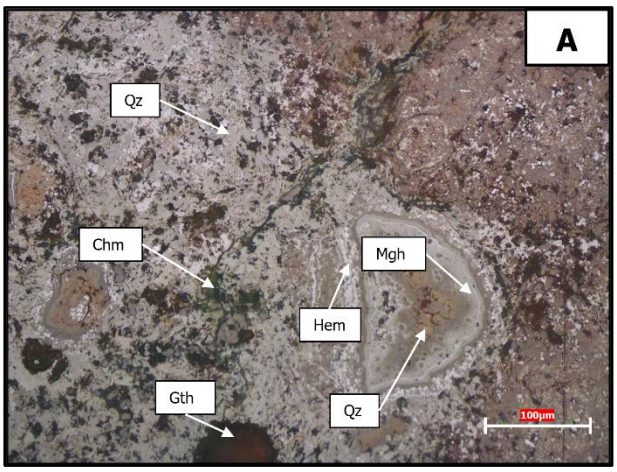
HASIL ANALISIS MIKROSKOPIS

Lokasi	**:** Desa Samaenre, Kecamatan Tonra, Kabupaten Bone	**Kode Sampel**	**: SML**
Tipe Mineralisasi	**: Supergen**		
Mineral Bijih	**: Goetit, Maghemit, Hematit, Kamosit**		
Mineral Pengotor	**: Kuarsa**		
Referensi	**:(Kontak, 2005), (Warr, 2021)**		

Deskripsi Mineralogi

Komposisi Mineral	Simbol	Keterangan optik mineral
Goetit	**(Goe)**	Sistem kristal ortorombik, berwarna hitam kecoklatan dengan bentuk (*subhedral*), ukuran mineral yang tampak yaitu 50 µm-100 µm.
Hematit	**(Hem)**	Sistem kristal trigonal, berwarna putih dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 10 µm-100 µm
Kuarsa	**(Qz)**	Sistem kristal trigonal, berwarna abu-abu terang dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 20 µm-50 µm
Kamosit (Chm)	**(Chm)**	Sistem kristal monoklin, berwarna hijau gelap dengan bentuk (anhedral-subhedral), ukuran mineral yang tampak yaitu 10 µm-20 µm
Maghemit (Mgh)	**(Mgh)**	Sistem kristal isometrik, berwarna putih keabu-abuan dengan bentuk (*subhedral*), ukuran mineral yang tampak yaitu 20 µm-50 µm

Foto

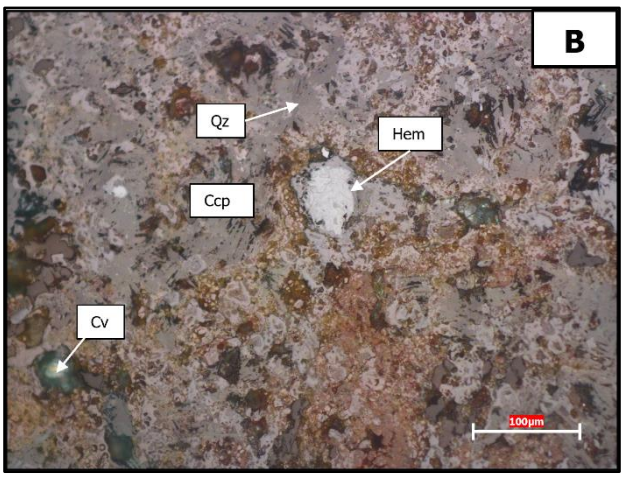


Lokasi	**:** Desa Samaenre, Kecamatan Tonra, Kabupaten Bone	**Kode Sampel**	**: SML**
Tipe Mineralisasi	**: Supergen**		
Mineral Bijih	**: Hematit, Kalkopirit, Kovelit**		
Mineral Pengotor	**: Kuarsa**		
Referensi	**:(Kontak, 2005), Warr (2021)**		

Deskripsi Mineralogi

Komposisi Mineral	Simbol	Keterangan optik mineral
Hematit	**(Hem)**	Sistem kristal trigonal, berwarna putih dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 10 µm-100 µm
Kuarsa	**(Qz)**	Sistem kristal trigonal, berwarna abu-abu terang dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 20 µm-50 µm
Kalkopirit	**(Ccp)**	sistem kristal tetragonal, berwarna kuning terang dengan bentuk (subhedral), ukuran mineral yang tampak yaitu 5 µm-10 µm
Kovelit	**(Cv)**	sistem kristal heksagonal, berwarna kuning mengkilap dengan bentuk (anhedral-subhedral), ukuran mineral yang tampak 10 µm-20 µm.

Foto

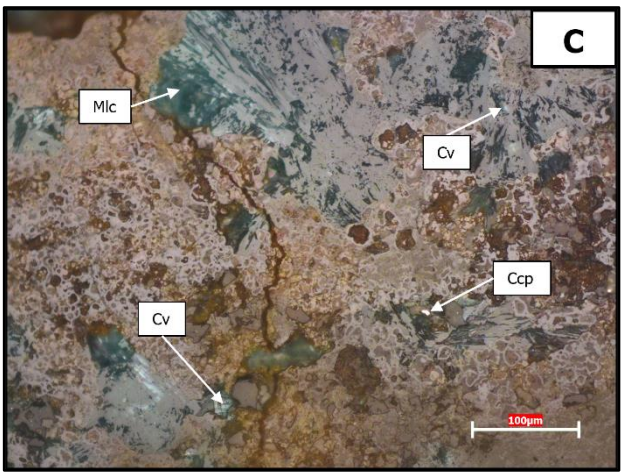


Lokasi	**:** Desa Samaenre, Kecamatan Tonra, Kabupaten Bone	**Kode Sampel**	**: SML**
Tipe Mineralisasi	**: Supergen**		
Mineral Bijih	**: Malasit, Kalkopirit, Kovelit**		
Mineral Pengotor	**: -**		
Referensi	**:(Kontak, 2005), Warr (2021)**		

Deskripsi Mineralogi

Komposisi Mineral	Simbol	Keterangan optik mineral
Malasit	**(Mlc)**	Sistem kristal trigonal, berwarna putih dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 10 µm-100 µm
Kalkopirit	**(Ccp)**	Sistem kristal tetragonal, berwarna kuning terang dengan bentuk (subhedral), ukuran mineral yang tampak yaitu 5 µm-10 µm
Kovelit	**(Cv)**	Sistem kristal heksagonal, berwarna kuning mengkilap dengan bentuk (anhedral-subhedral), ukuran mineral yang tampak 10 µm-20 µm.

Foto



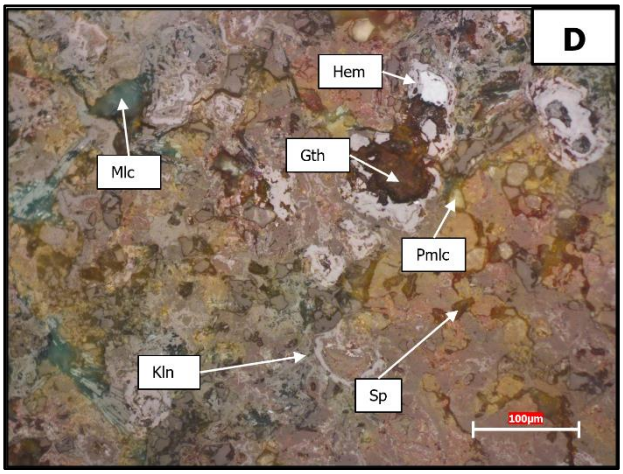
Lokasi	**:** Desa Samaenre, Kecamatan Tonra, Kabupaten Bone	**Kode Sampel**	**: SML**
Tipe Mineralisasi	**: Supergen**		
Mineral Bijih	**: Malasit, Pseudomalasit, Kalkopirit, Kovelit, Goetit**		
Mineral Pengotor	**: Kaolinit, Spalerit**		
Referensi	**:(Kontak, 2005), Warr (2021)**		

Deskripsi Mineralogi

Kenampakan mikroskopis memperlihatkan mineral goetit, hematit, kuarsa, kamosit, dan maghemit

Komposisi Mineral	Simbol	Keterangan optik mineral
Malasit	**(Mlc)**	Sistem kristal trigonal, berwarna putih dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 10 µm-100 µm
Kaolinit	**(Kln)**	Sistem kristal triklin, berwarna merah pucat dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak yaitu 50 µm-100 µm.
Kovelit	**(Cv)**	Sistem kristal heksagonal, berwarna kuning mengkilap dengan bentuk (anhedral-subhedral), ukuran mineral yang tampak 10 µm-20 µm.
Goetit	**(Goe)**	Sistem kristal ortorombik, berwarna hitam kecoklatan dengan bentuk (*subhedral*), ukuran mineral yang tampak yaitu 50 µm-100 µm.
Pseudomalsit	**(Pmlc)**	Sistem kristal monoklin, berwarna hijau kekuningan dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak 10 µm-50 µm
Spalerit	**(Sp)**	Sistem kristal isometrik, berwarna hijau coklat dengan bentuk (*anhedral-subhedral*), ukuran mineral yang tampak 10 µm-30 µm.

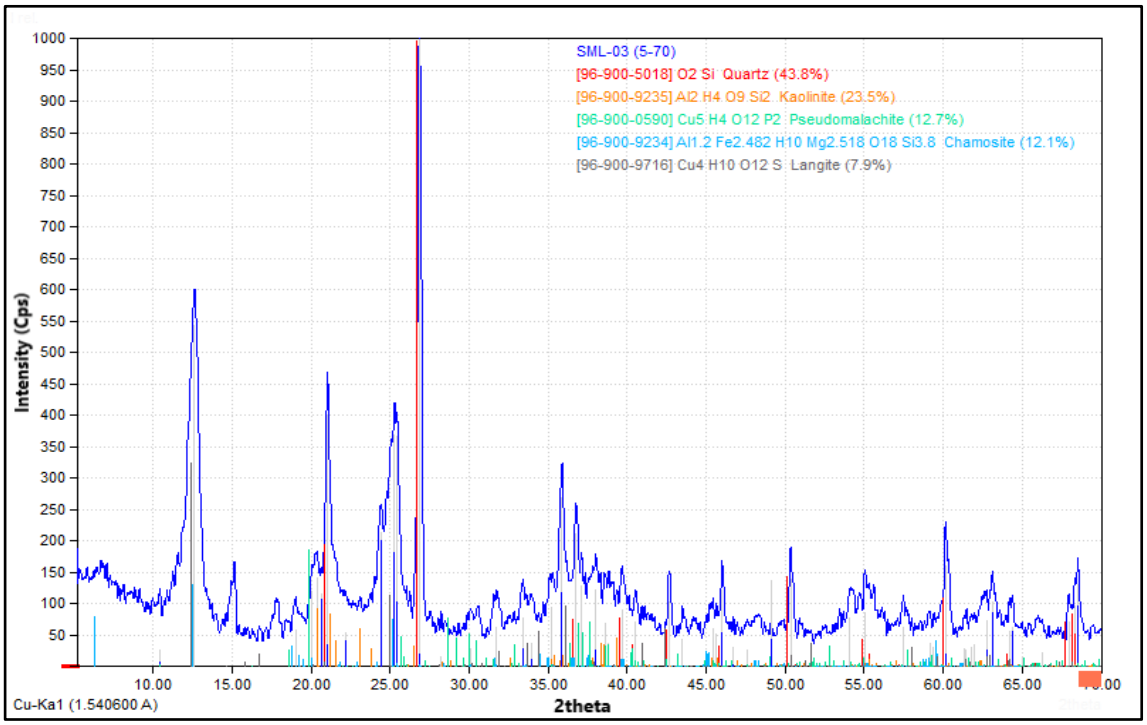
Foto



LAMPIRAN B

HASIL ANALISIS XRD

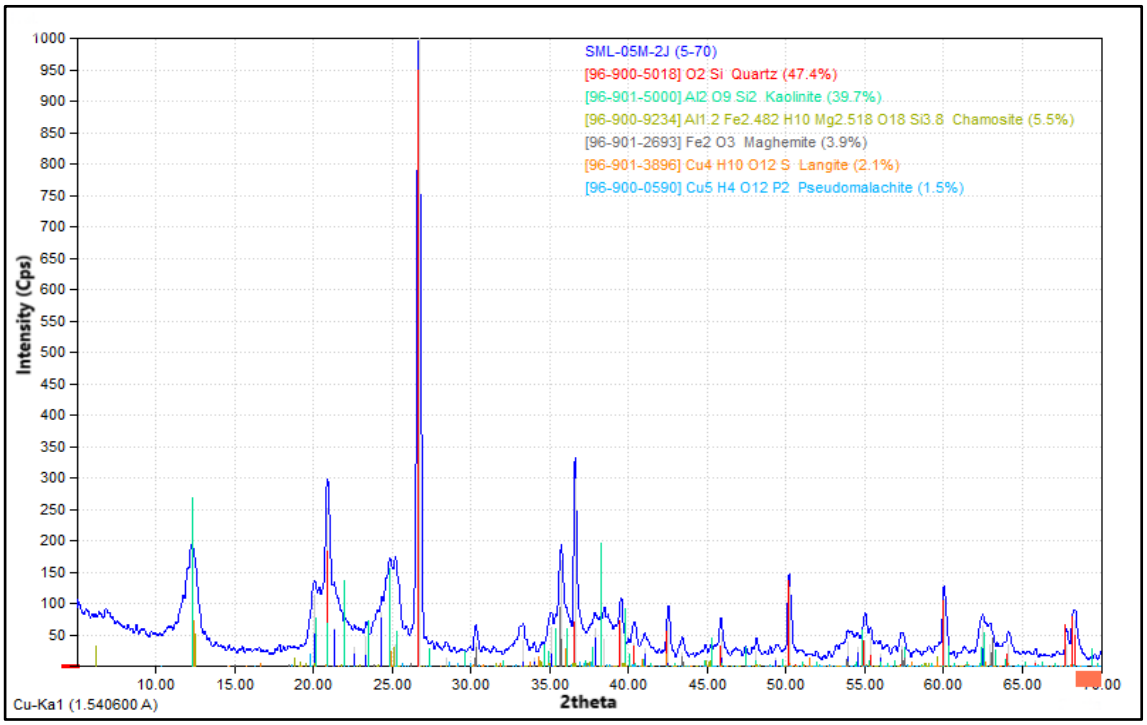
1. Sampel awal



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	10.42	8.4829	27.46	0.7362	D
2	12.58	7.0308	542.77	0.7362	B,C,E
3	15.12	5.8549	106.23	0.3316	F
4	19.02	4.6623	57.99	0.5836	C,E
5	20.06	4.4228	120.67	0.5412	B,C,D,E
6	20.34	4.3626	141.75	0.4988	B
7	20.62	4.3040	115.42	0.4565	C
8	21.04	4.2190	401.14	0.4141	A,B,C,D,E
9	22.14	4.0118	53.68	4.8000	D
10	24.38	3.6480	214.61	0.6561	C
11	25.26	3.5229	370.05	0.8980	C,D,E
12	25.44	3.4984	367.79	0.4000	C,D
13	26.82	3.3214	1000.00	0.2940	A,C
14	28.24	3.1576	15.08	0.6709	B,C,E
15	30.04	2.9723	28.44	0.6344	C,D,E,F
16	31.72	2.8186	63.69	0.4927	B,C,D,E
17	33.40	2.6806	77.05	0.5100	C,D,E
18	33.92	2.6407	37.36	0.5600	E,F
19	35.24	2.5447	94.43	0.4607	B,C,D,E
20	35.86	2.5022	269.46	0.4113	B,E,F
21	36.76	2.4429	210.75	0.4113	A,C,D
22	37.08	2.4226	129.59	0.4113	C,D,F
23	37.98	2.3672	122.12	0.4113	B,C,D,E
24	38.60	2.3306	69.18	0.3600	B,C,D,E
25	38.82	2.3179	36.86	0.7600	B,C,D,E,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	42,8	*Quartz*	O2 Si
B	20,9	*Kaolinite*	Al2 H4 O9 Si2
C	15,8	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
D	11,1	*Pseudomalachite*	Cu5 H4 O12 P2
E	6,1	*Langite*	Cu4 H10 O12 S
F	3,1	*Maghemite*	Fe2 O3

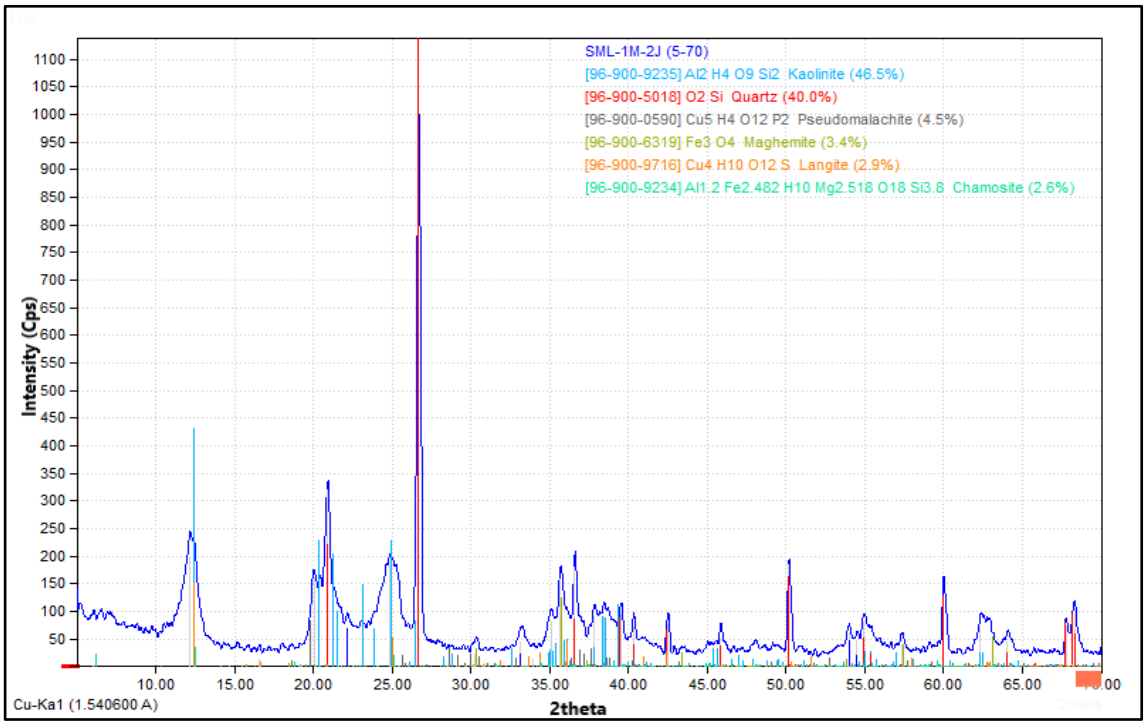
2. Pelindian 0,5 M 2 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.30	7.1902	163.91	0.7600	B,C,E
2	14.62	6.0540	0.84	0.1400	E
3	20.08	4.4185	114.32	0.6000	B,C,E,F
4	20.92	4.2429	251.27	0.3600	A,B,C,E,F
5	21.32	4.1642	61.60	1.0800	D
6	22.64	3.9243	29.87	6.0800	C,F
7	23.36	3.8050	46.87	0.2800	B
8	24.32	3.6569	86.66	0.7200	C
9	24.88	3.5759	131.21	1.1600	B,E
10	25.22	3.5284	34.35	0.6400	B,C,F
11	26.70	3.3361	1000.00	0.2800	A,C
12	28.44	3.1358	14.42	0.2443	C,F
13	30.32	2.9455	37.86	0.2400	C,D,E,F
14	33.30	2.6884	42.05	0.2400	C,E,F
15	34.02	2.6332	14.36	0.3600	D
16	35.08	2.5560	62.71	0.4800	B,C,E,F
17	35.74	2.5103	168.42	0.4000	D
18	36.62	2.4519	298.31	0.2000	A,C,F
19	37.88	2.3732	60.42	1.0000	B,C,E,F
20	38.48	2.3376	44.26	2.1200	B,C,E,F
21	39.54	2.2773	60.40	0.3200	A,B,C
22	40.36	2.2329	36.55	0.3600	A,B,C,D,E,F
23	41.02	2.1985	29.37	0.3000	B,C,E,F
24	42.54	2.1234	71.38	0.2400	A,B,C,E,F
25	43.38	2.0842	22.99	0.2630	C,D,E,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	47,8	*Quartz*	O2 Si
B	39,7	*Kaolinite*	Al2 H4 O9 Si2
C	5,5	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
F	1,5	*Pseudomalachite*	Cu5 H4 O12 P2
E	2,1	*Langite*	Cu4 H10 O12 S
D	3,9	*Maghemite*	Fe2 O3

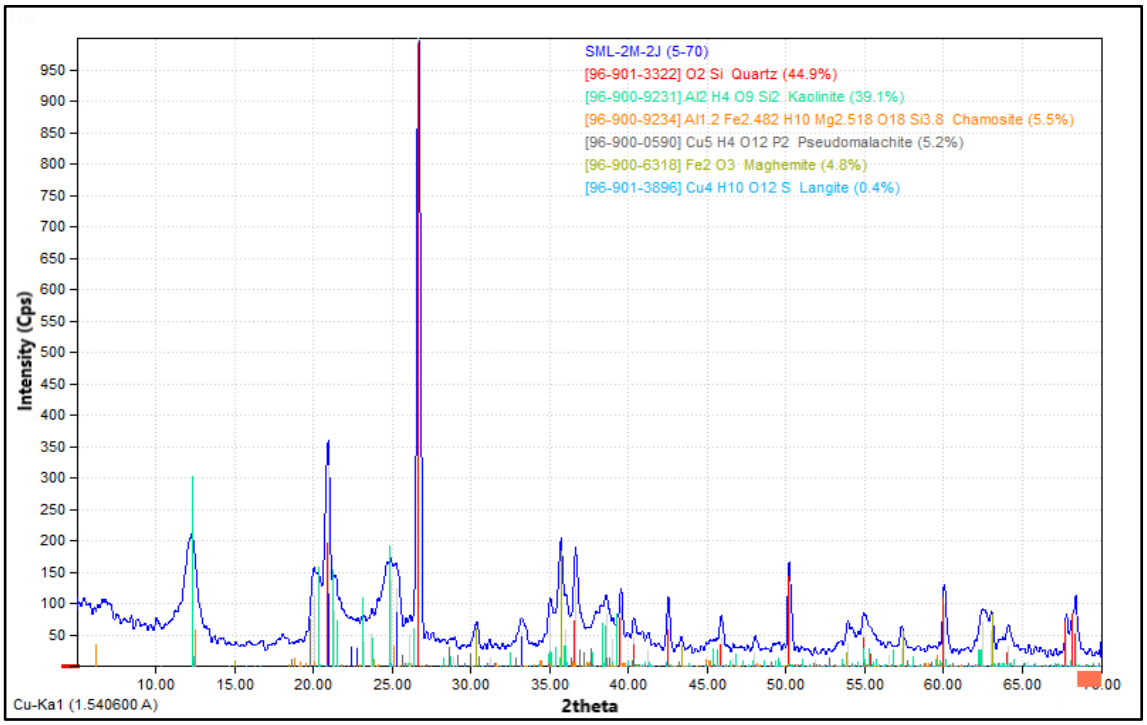
3. Pelindian 1 M 2 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	6.08	14.5249	1.08	0.1400	F
2	12.18	7.2608	199.32	1.0078	A,E
3	16.56	5.3489	12.87	1.0078	C,E
4	20.04	4.4272	159.71	1.0078	A,C,E,F
5	20.38	4.3541	139.26	1.0078	A
6	20.88	4.2510	319.38	0.4400	B,C,E,F
7	22.14	4.0118	72.31	0.4400	C
8	24.82	3.5844	183.23	0.4400	A,E
9	26.66	3.3410	1000.00	0.3083	A,B,F
10	30.28	2.9493	23.15	0.3965	C,D,E,F
11	30.88	2.8934	6.12	0.4843	C,D,E
12	33.16	2.6995	44.90	0.5722	C,E,F
13	33.94	2.6392	12.16	0.5722	D,E
14	35.08	2.5560	80.49	0.5722	A,C,E,F
15	35.66	2.5157	158.42	0.5722	A,D
16	36.58	2.4545	179.13	0.5722	B,C,F
17	37.82	2.3769	89.71	0.5722	A,C,E,F
18	38.42	2.3411	91.46	0.5722	A,C,D,E,F
19	39.54	2.2773	92.27	0.5722	A,B,F
20	40.32	2.2351	71.94	0.5722	A,B,C,E,F
21	42.48	2.1263	76.89	0.2208	A,B,C,D,E,F
22	45.84	1.9779	52.82	0.3416	A,B,C,D,E,F
23	50.18	1.8166	185.39	0.2515	A,B,C,E,F
24	53.98	1.6973	61.42	0.4559	A,C,D,E,F
25	54.50	1.6823	47.81	0.4559	A,C,E,F

Index	*Amount (%)*	*Name*	*Formula sum*
B	40	*Quartz*	O2 Si
A	46,5	*Kaolinite*	Al2 H4 O9 Si2
F	2,6	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
C	4,5	*Pseudomalachite*	Cu5 H4 O12 P2
E	2,9	*Langite*	Cu4 H10 O12 S
D	3,4	*Maghemite*	Fe2 O3

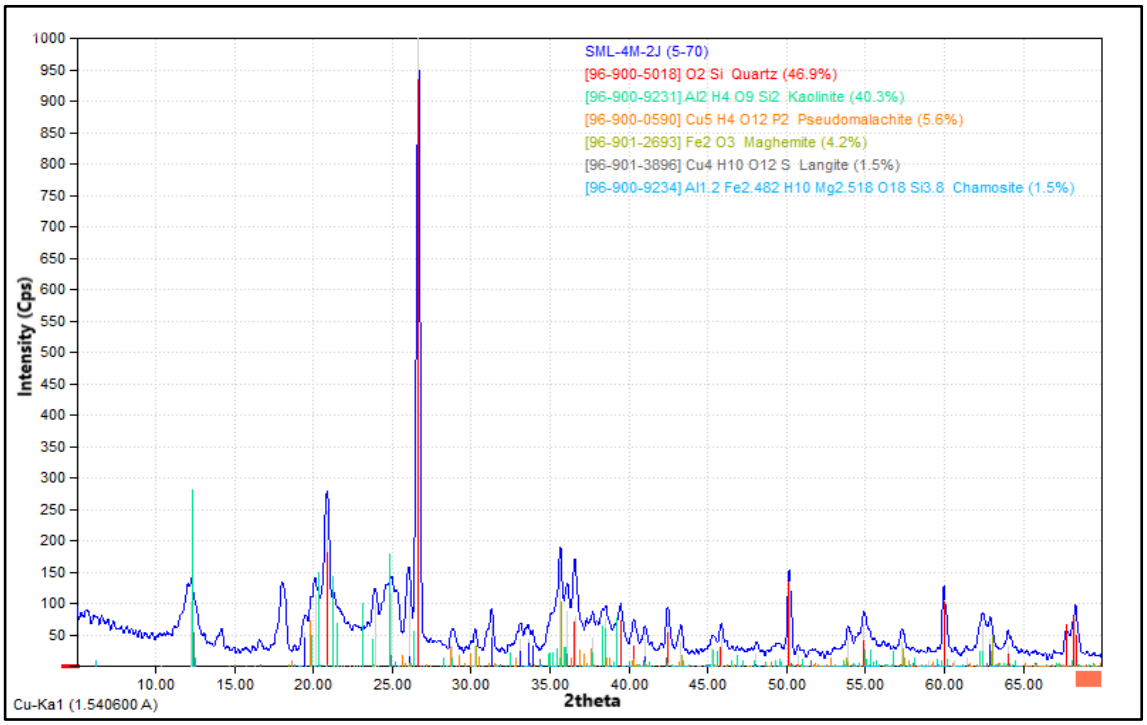
4. Pelindian 2 M 2 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.30	7.1902	148.37	0.3600	B,C,F
2	20.06	4.4228	113.97	0.5600	B,C,D,F
3	20.96	4.2349	320.56	0.2400	A,C,D,F
4	21.38	4.1527	88.83	0.5200	B,F
5	22.38	3.9693	33.39	0.0400	D
6	22.82	3.8938	34.01	0.0400	C,D
7	23.24	3.8244	39.10	0.1600	B
8	23.72	3.7480	51.48	0.2800	B,E
9	24.90	3.5730	138.15	0.2400	B,F
10	25.26	3.5229	123.63	0.5200	C,D
11	26.12	3.4088	49.85	0.3800	B,D,E
12	26.68	3.3385	1000.00	0.2400	A,C
13	28.92	3.0849	13.72	0.3644	B,D,F
14	30.38	2.9398	44.86	0.2400	C,D,E,F
15	31.20	2.8644	13.61	0.1429	D
16	33.20	2.6963	54.56	0.1200	C,D,F
17	35.04	2.5588	83.25	0.2000	B,C,D,F
18	35.72	2.5116	181.48	0.3200	B,E
19	36.04	2.4901	59.34	1.6000	B,F
20	36.64	2.4507	125.53	0.2800	A,C,D
21	38.60	2.3306	83.57	0.2000	B,C,D,F
22	39.02	2.3065	43.79	0.2000	B,C,E,F
23	39.54	2.2773	93.68	0.1600	A,C
24	40.36	2.2329	46.02	0.2000	A,B,C,D,E,F
25	41.24	2.1873	26.57	0.3532	B,C,D,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	44,9	*Quartz*	O2 Si
B	39,1	*Kaolinite*	Al2 H4 O9 Si2
C	5,5	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
D	5,2	*Pseudomalachite*	Cu5 H4 O12 P2
F	0,4	*Langite*	Cu4 H10 O12 S
E	4,8	*Maghemite*	Fe2 O3

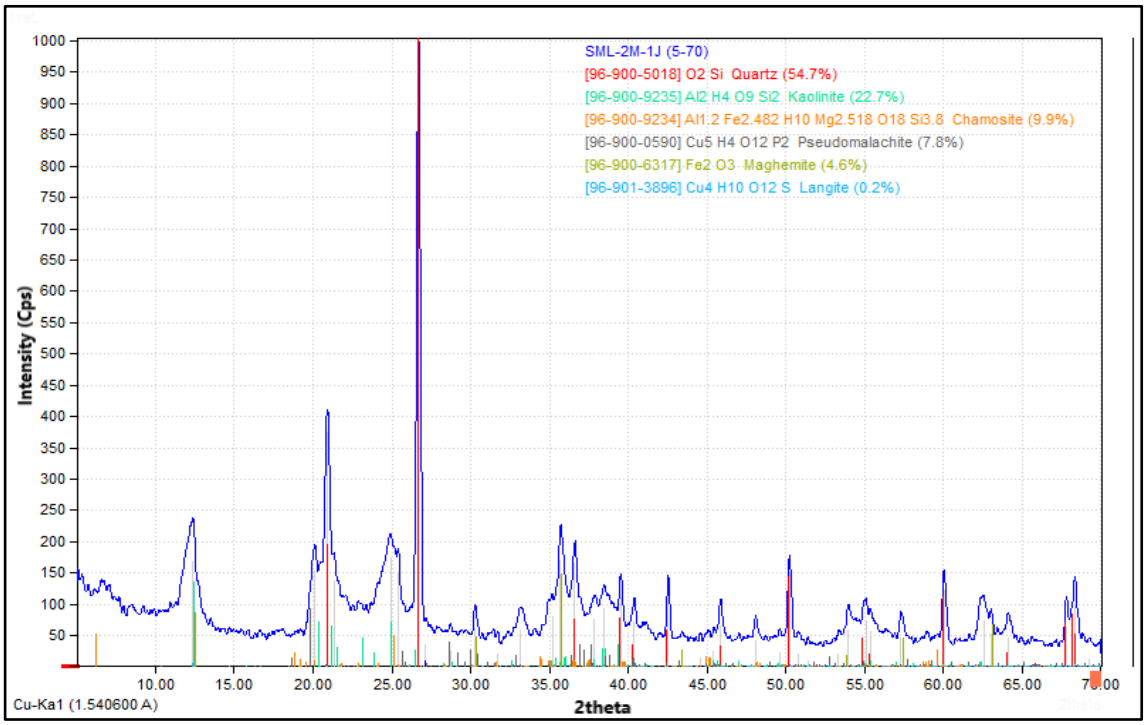
5. Pelindian 4 M 2 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.27	7.2077	103.92	0.7200	B,E,F
2	19.45	4.5602	54.65	0.5600	E,F
3	20.11	4.4120	114.78	0.7200	B,C,E,F
4	20.87	4.2530	247.95	0.4000	A,C,E,F
5	21.27	4.1739	43.11	1.4800	B,D
6	23.91	3.7187	98.11	0.5200	B,D,F
7	24.93	3.5688	115.98	1.0400	B,C,E,F
8	26.05	3.4178	119.45	0.3200	B,C,D
9	26.65	3.3422	1000.00	0.2800	A,B,F
10	28.83	3.0943	32.55	0.3200	B,C,E
11	30.25	2.9522	32.39	0.2400	C,D,E,F
12	31.29	2.8564	66.00	0.2800	B,C
13	33.11	2.7034	44.33	0.6000	C,E
14	33.61	2.6643	44.24	0.5000	E,F
15	33.91	2.6414	33.59	0.4500	D
16	35.65	2.5164	167.30	0.4000	B,D,F
17	36.09	2.4867	88.28	1.5600	B,E
18	36.57	2.4552	80.59	0.4800	A,C,F
19	37.69	2.3848	46.67	4.0400	B,C,E,F
20	38.51	2.3358	75.91	0.2800	B,C,E,F
21	39.47	2.2812	47.42	0.4400	A,B,F
22	40.31	2.2356	31.95	0.4400	A,B,C,D,E,F
23	41.03	2.1980	42.73	0.3600	B,C,E,F
24	42.45	2.1277	68.16	0.2800	A,B,C,E,F
25	43.29	2.0884	38.95	0.2800	B,C,D,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	46,9	*Quartz*	O2 Si
B	40,3	*Kaolinite*	Al2 H4 O9 Si2
F	1,5	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
C	5,6	*Pseudomalachite*	Cu5 H4 O12 P2
E	1,5	*Langite*	Cu4 H10 O12 S
D	4,2	*Maghemite*	Fe2 O3

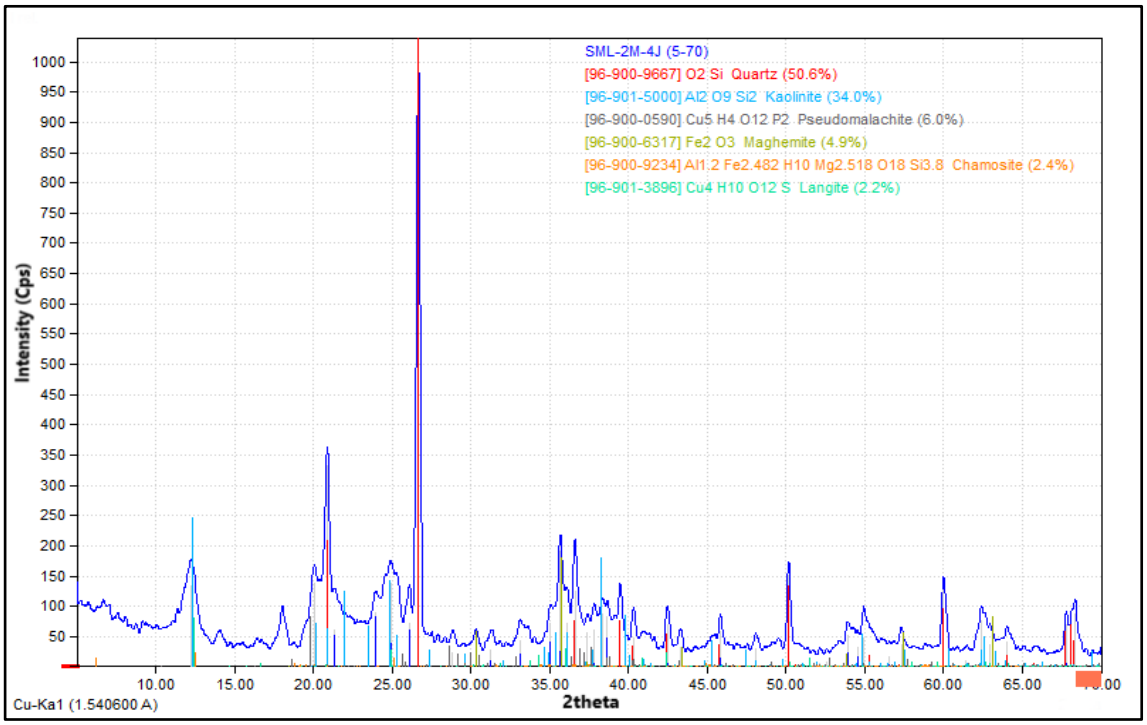
6. Pelindian 2 M 1 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.39	7.1382	168.52	0.6454	B,C,F
2	20.11	4.4120	151.69	0.5515	B,C,D,F
3	20.91	4.2449	374.14	0.4576	A,C,D,F
4	21.33	4.1623	138.12	0.4576	B,F
5	24.91	3.5716	173.25	0.4576	B,F
6	25.39	3.5052	148.58	0.4576	C,D
7	26.67	3.3398	1000.00	0.2724	A,B,C
8	27.15	3.2818	35.32	0.2724	C,D
9	28.71	3.1069	24.48	0.5480	B,C,D
10	30.27	2.9503	60.80	0.5480	C,D,E,F
11	31.71	2.8195	19.37	0.5480	B,C,D,F
12	33.17	2.6987	58.87	0.5480	C,D,F
13	35.17	2.5496	79.52	0.6565	B,C,D,F
14	35.69	2.5137	168.99	0.7650	B,E
15	36.59	2.4539	165.13	0.7650	A,C,D
16	37.81	2.3775	75.06	0.7650	B,C,D,F
17	38.47	2.3382	92.96	0.7650	B,C,D,F
18	39.51	2.2790	110.66	0.7650	A,B,C
19	40.39	2.2314	71.11	0.7650	A,B,C,D,F
20	42.55	2.1229	108.93	0.7650	A,B,C,D,F
21	44.55	2.0322	13.54	0.5708	C,D
22	45.43	1.9948	24.21	0.4737	B,C,D
23	45.87	1.9767	64.11	0.3766	A,B,D,F
24	46.99	1.9322	12.21	0.3118	B,C,D,F
25	48.07	1.8913	41.01	0.3133	B,C,D,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	54,7	*Quartz*	O2 Si
B	22,7	*Kaolinite*	Al2 H4 O9 Si2
C	9,9	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
D	7,8	*Pseudomalachite*	Cu5 H4 O12 P2
F	0,2	*Langite*	Cu4 H10 O12 S
E	4,6	*Maghemite*	Fe2 O3

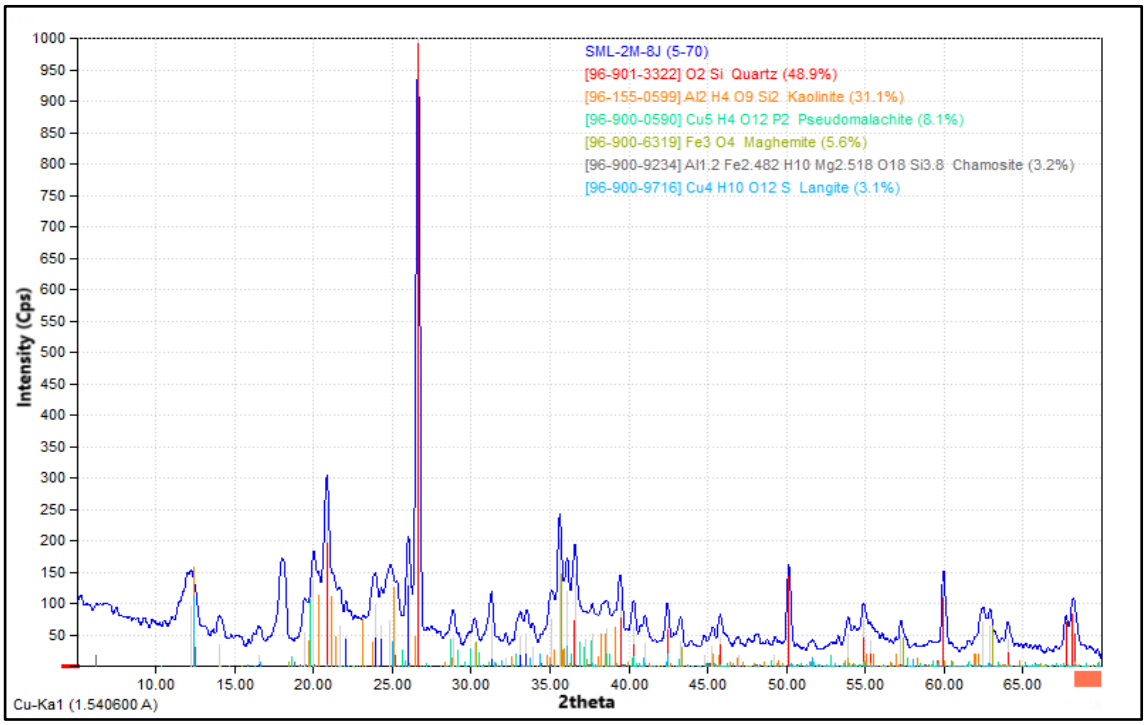
7. Pelindian 2 M 4 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.26	7.2136	134.51	0.7200	B,E,F
2	20.08	4.4185	137.02	0.6000	B,C,E,F
3	20.90	4.2469	332.72	0.3600	A,B,C,E,F
4	21.36	4.1565	61.66	1.6000	F
5	23.98	3.7080	88.46	0.6800	E
6	24.92	3.5702	137.11	1.2800	B,C,E,F
7	26.10	3.4114	72.47	0.6400	C
8	26.68	3.3385	1000.00	0.2800	A,E
9	28.82	3.0953	24.09	0.2840	C,F
10	30.30	2.9474	27.86	0.2695	C,D,E,F
11	31.28	2.8573	26.97	0.3474	C
12	33.14	2.7010	42.96	0.3600	C,E,F
13	35.06	2.5574	71.46	0.3600	B,C,E,F
14	35.68	2.5144	189.95	0.4000	B,D
15	36.08	2.4874	72.15	1.9200	B,F
16	36.62	2.4519	124.62	0.3600	A,C,E
17	37.34	2.4063	56.51	0.2800	B,C,D,E,F
18	37.84	2.3757	60.03	3.7600	B,C,F
19	38.34	2.3458	87.35	0.2800	B,E,F
20	38.66	2.3271	82.06	0.3200	C,E
21	39.48	2.2807	71.06	0.3600	A,B,E
22	40.34	2.2340	47.06	0.3200	A,B,C,E,F
23	42.48	2.1263	70.08	0.3200	A,B,C,E,F
24	43.32	2.0870	32.43	0.3200	C,D,E
25	45.84	1.9779	59.60	0.3200	A,B,C,E,F

Index	*Amount (%)*	*Name*	*Formula sum*
A	50,6	*Quartz*	O2 Si
B	34	*Kaolinite*	Al2 H4 O9 Si2
E	2,4	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
C	6	*Pseudomalachite*	Cu5 H4 O12 P2
F	2,2	*Langite*	Cu4 H10 O12 S
D	4,9	*Maghemite*	Fe2 O3

8. Pelindian 2 M 8 Jam



No	2theta [°]	d [Å]	I/I0	FWHM	*Matched*
1	12.24	7.2253	96.51	0.6400	B,E,F
2	14.06	6.2939	35.37	0.3371	D
3	16.52	5.3618	17.08	0.2427	C,F
4	19.44	4.5625	54.98	0.0800	E,F
5	20.02	4.4316	134.76	0.4000	B,C,E,F
6	20.86	4.2550	262.15	0.4000	A,C,E,F
7	21.68	4.0959	65.60	0.0800	B,E,F
8	22.06	4.0262	47.36	0.2000	C
9	23.92	3.7171	98.19	0.2800	B,E
10	24.30	3.6599	64.97	1.4400	E
11	24.88	3.5759	73.27	0.7600	B,E,F
12	26.02	3.4217	148.51	0.3200	B,C
13	26.64	3.3435	1000.00	0.2800	A,B,E
14	28.86	3.0911	45.55	0.3200	B,C,F
15	30.22	2.9550	36.66	0.3033	C,D,E,F
16	31.30	2.8555	67.89	0.1600	C,D,E
17	32.18	2.7794	13.54	0.1122	F
18	33.12	2.7026	48.66	0.3064	C,F
19	33.52	2.6713	51.51	0.4527	D,E
20	33.90	2.6422	30.07	0.3664	F
21	35.12	2.5532	75.58	0.2800	B,C,E,F
22	35.64	2.5171	203.29	0.2800	B,D
23	36.10	2.4861	120.05	0.3200	B,F
24	36.60	2.4532	147.16	0.2800	A,C,E
25	37.26	2.4113	43.91	4.9200	C,D,E

Index	*Amount (%)*	*Name*	*Formula sum*
A	48,9	*Quartz*	O2 Si
B	31,1	*Kaolinite*	Al2 H4 O9 Si2
E	3,2	*Chamosite*	Al1.2 Fe2.482 H10 Mg2.518 O18 Si3.8
C	8,1	*Pseudomalachite*	Cu5 H4 O12 P2
F	3,1	*Langite*	Cu4 H10 O12 S
D	5.6	*Maghemite*	Fe2 O3

LAMPIRAN C

HASIL ANALISIS AAS

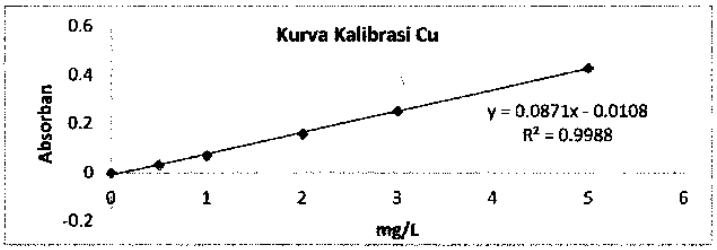
DEPARTEMEN KIMIA
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS HASANUDDIN
Kampus Unhas Tamalanrea Jl Perintis kemerdekaan Km.10 Tamalanrea Makassar 90245.
Tlp/fax:0411-586498, Alamat E-mail :L kimiauh@indosat.net.id

No. : 16/LKA/HA-AAS/VII/2022
Nama : Mukhlis NIM : D111181306
Fakultas : Teknik / Teknik Pertambangan
Sampel : Larutan dan Serbuk
Jumlah sampel : 8
Analisa : Tembaga (Cu) Tanggal Preparasi : 19-Jul-22
Tgl surat masuk : 18-Jul-22 Tanggal Analisa : 22-Jul-22
Tgl terima sampel : 19-Jul-22 Tanggal selesai : 22-Jul-22

Optimasi Analisa Tembaga (Cu)				
Type Alat: AAS Buck Scientific 205	Intgr Time	: 3,0 S	Bkg Gain	: 1
Version 3.94C	Data Times	: 56 mS	Energy sample	: 3,444
HCL Cu Buck Scientific	Ave HCL	: 1,5 mA	DC Suppr	: on
P. gel. : 324.7 nm	Peak HCL	: 6,0 mA	Slit	: 0,7 nm
No Bkgnd Compensation	Min HCL Curr	: 0,0 mA	Meth.	: Air/Acet

[Cu] mg/L	Absorban
0	-0.002041
0.5	0.031485
1	0.070585
2	0.157135
3	0.251809
5	0.427337

Kurva Kalibrasi Tembaga



Kode Sampel	B. Cawan Kosong (G)	Berat Sebelum Pemanasan (G)	B. Sampel (B. Basah) (G)	Berat setelah Pemanasan (G)	B. Sampel (B. Kering) (G)	Kadar Air (%)
serbuk	28.7712	30.7748	2.0036	30.7462	1.9750	1.43

Kode Sampel	Absorban	[Cu] (mg/L)	fp (kali)	[Cu] x fp (mg/L)	W sampel (g)	V Sampel (mL)	Kadar Cu (mg/kg=ppm)
Serbuk	0.1976	2.3927	100	239.11	0.5065	50	23604.36
	0.1990	2.4087					
	0.1958	2.3720					
Rata-Rata =	**0.1975**	**2.3911**					

	Absorban	[Cu] (mg/L)	fp (kali)	Konst Cu (mg/L)
0,5M, 2h	0.3718	4.466	100	4465.748
	0.3833			
	0.3794			
Rata-Rata =	**0.3782**			

LABORATORIUM KIMIA ANALITIK
DEPARTEMEN KIMIA
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UNIVERSITAS HASANUDDIN
Kampus Unhas Tamalanrea Jl Perintis kemerdekaan Km.10 Tamalanrea Makassar 90245.
Tlp/fax:0411-586498, Alamat E-mail :L kimiauh@indosat.net.id

Kode Sampel	Absorban	[Cu] (mg/L)	fp (kali)	Konst Cu (mg/L)
1M, 2h	0.3221	3.842	100	3842.327
	0.3267			
	0.3228			
Rata-Rata =	**0.3239**			
2M, 1h	0.0832	1.088	500	5438.194
	0.0862			
	0.0824			
Rata-Rata =	**0.0839**			
2M, 2h	0.2951	3.495	100	3494.834
	0.2985			
	0.2872			
Rata-Rata =	**0.2936**			
2M, 4h	0.0811	1.051	500	5252.583
	0.0809			
	0.0801			
Rata-Rata =	**0.0807**			
2M, 8h	0.3209	3.896	100	3895.522
	0.3333			
	0.3313			
Rata-Rata =	**0.3285**			
4M, 2h	0.3494	4.121	100	4121.316
	0.3470			
	0.3481			
Rata-Rata =	**0.3482**			

Mengetahui,
Ketua

Dr. Maryam Marsiah La Nafie, M.Sc
NIP. 19680523 198710 2 001

Makassar, 27 Juli 2022
PLP.

Fibiyanthy, S.Si
NIP. 19810202 200604 2 001

LAMPIRAN D

PERHITUNGAN PENGENCERAN ASAM SITRAT

1. Perhitungan mol asam sitrat ($C_6H_8O_7$)
    a. mol (n) $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 0,5 M

        $n = M \times V$

        $n = 0,5 \times 0,15$

        $n = 0,075$ mol

    b. mol (n) $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 1 M

        $n = M \times V$

        $n = 1 \times 0,15$

        $n = 0,15$ mol

    c. mol (n) $C_6H_8O_7$ untuk volume (V) 0,6 L dan molaritas (M) 2 M

        $n = M \times V$

        $n = 2 \times 0,6$

        $n = 1,2$ mol

    d. mol (n) $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 4 M

        $n = M \times V$

        $n = 4 \times 0,15$

        $n = 0,6$ mol

2. Perhitungan massa asam sitrat ($C_6H_8O_7$) yang dibutuhkan (Mr $C_6H_8O_7$ = 192,13)
    a. Massa $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 0,5 M

        massa = mol × Mr

        massa = 0,075 × 192,13

        massa = 14,41 gr

    b. Massa $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 1 M

        massa = mol × Mr

        massa = 0,15 × 192,13

        massa = 28,82 gr

c. Massa $C_6H_8O_7$ untuk volume (V) 0,6 L dan molaritas (M) 2 M

massa= mol × Mr

massa= 1,2 × 192,13

massa= 230,55gr

d. Massa $C_6H_8O_7$ untuk volume (V) 0,15 L dan molaritas (M) 4 M

massa= mol × Mr

massa= 0,6 × 192,13

massa= 115,28 gr

LAMPIRAN E

PERHITUNGAN KADAR Cu

Kadar tembaga dihitung dengan rumus sebagai berikut:

$$\text{Kadar } (\%) = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100\%$$

1. Kadar sampel awal

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{2{,}3911 \text{ (mg/L)} \times 100 \times 0{,}05\text{(L)}}{506{,}5\text{(mg)}} \times 100\%$$

$$\text{Kadar Cu (\%)} = 2{,}36\%$$

2. Pelindian 0,5 Molar 2 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{4{,}466 \text{ (mg/L)} \times 100 \times 0{,}15\text{(L)}}{15000\text{(mg)}} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}45\%$$

3. Pelindian 1 Molar 2 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{3{,}842 \text{ (mg/L)} \times 100 \times 0{,}15\text{(L)}}{15000\text{(mg)}} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}38\%$$

4. Pelindian 2 Molar 2 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{3{,}495\ (\text{mg/L}) \times 100 \times 0{,}15(\text{L})}{15000(\text{mg})} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}35\%$$

5. Pelindian 4 Molar 2 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{4{,}121\ (\text{mg/L}) \times 100 \times 0{,}15(\text{L})}{15000(\text{mg})} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}41\%$$

6. Pelindian 2 Molar 1 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{1{,}051\ (\text{mg/L}) \times 500 \times 0{,}15(\text{L})}{15000(\text{mg})} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}53\%$$

7. Pelindian 2 Molar 4 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{1{,}088\ (\text{mg/L}) \times 500 \times 0{,}15(\text{L})}{15000(\text{mg})} \times 100\%$$

$$\text{Kadar Cu (\%)} = 0{,}54\%$$

8. Pelindian 2 Molar 8 Jam

$$\text{Kadar Cu (\%)} = \frac{\text{Hasil AAS (mg/L)} \times \text{fp} \times \text{volume (L)}}{\text{massa sampel (mg)}} \times 100$$

$$\text{Kadar Cu (\%)} = \frac{3{,}896\ (\text{mg/L}) \times 100 \times 0{,}15(\text{L})}{15000(\text{mg})} \times 100\%$$

Kadar Cu (%) = 0,39%

LAMPIRAN F

PERHITUNGAN *RECOVERY* Cu

Recovery tembaga dapat dihitung dengan rumus sebagai berikut:

$$\textit{Recovery} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

1. Pelindian 0,5 Molar 2 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}45\%}{2{,}36\%} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = 19{,}07\%$$

2. Pelindian 1 Molar 2 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}38\%}{2{,}36\%} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = 16{,}10\%$$

3. Pelindian 2 Molar 2 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}35\%}{2{,}36\%} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = 14{,}83\%$$

4. Pelindian 4 Molar 2 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}41\%}{2{,}36\%} \times 100\%$$

Recovery Cu = 17,37%

5. Pelindian 2 Molar 1 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}53\%}{2{,}36\%} \times 100\%$$

Recovery Cu = 22,46%

6. Pelindian 2 Molar 4 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}54\%}{2{,}36\%} \times 100\%$$

Recovery Cu = 22,88%

7. Pelindian 2 Molar 8 Jam

$$\textit{Recovery}\ \text{Cu} = \frac{\text{Kadar hasil pelindian}}{\text{Kadar awal}} \times 100\%$$

$$\textit{Recovery}\ \text{Cu} = \frac{0{,}39\%}{2{,}36\%} \times 100\%$$

Recovery Cu = 16,53%

LAMPIRAN G

KARTU KONSULTASI TUGAS AKHIR

Kartu Konsultasi Tugas Akhir

JUDUL: Studi Ekstraksi Tembaga Dari Bijih Oksida Dengan Menggunakan Pelarut Asam Sitrat

(Konsultasi minimal 8 kali)

TANGGAL	MATERI KONSULTASI	PARAF DOSEN
10 Juni 2022	- Perbaiki latar belakang penelitian - Perbaiki tujuan penelitian - Perbaiki kesalahan penulisan	
14 Juni 2022	- Perbaiki penulisan daftar pustaka - Tambahkan referensi penelitian - Perbaiki kesalahan penulisan Bab 2	
20 Juni 2022	- Perbaiki flowchart penelitian - Perbaiki format penulisan Bab 3	
29 Juli 2022	- Asistensi hasil analisis mikroskopis - Asistensi hasil analisis XRD	
4 Agustus 2022	- Asistensi hasil analisis XRF	

TANGGAL	MATERI KONSULTASI	PARAF DOSEN
1 Agustus 2022	- Perbaiki penulisan hasil penelitan (Bab 4) - Tambahkan referensi mengenai hasil penelitian - Perbaiki kesalahan penulisan	
15 Agustus 2022	- Asistensi jurnal penelitan - Perbaiki kesalahan penulisan jurnal penelitian	
19 Agustus 2022	- Perbaiki abstrak penelitian - Perbaiki penulisan Bab 4 - Perbaiki kesimpulan	
23 Agustus 2022	- Acc seminar hasil	
20 September 2022	- Perbaiki peta lokasi penelitian - Tambahkan referensi Bab 2	
23 September 2022	- ~~Acc sidang tutup~~ Perbaiki abstrak	
26 September 2022	- Acc sidang tutup	
17 Oktober 2022	- Perbaiki format penulisan.	