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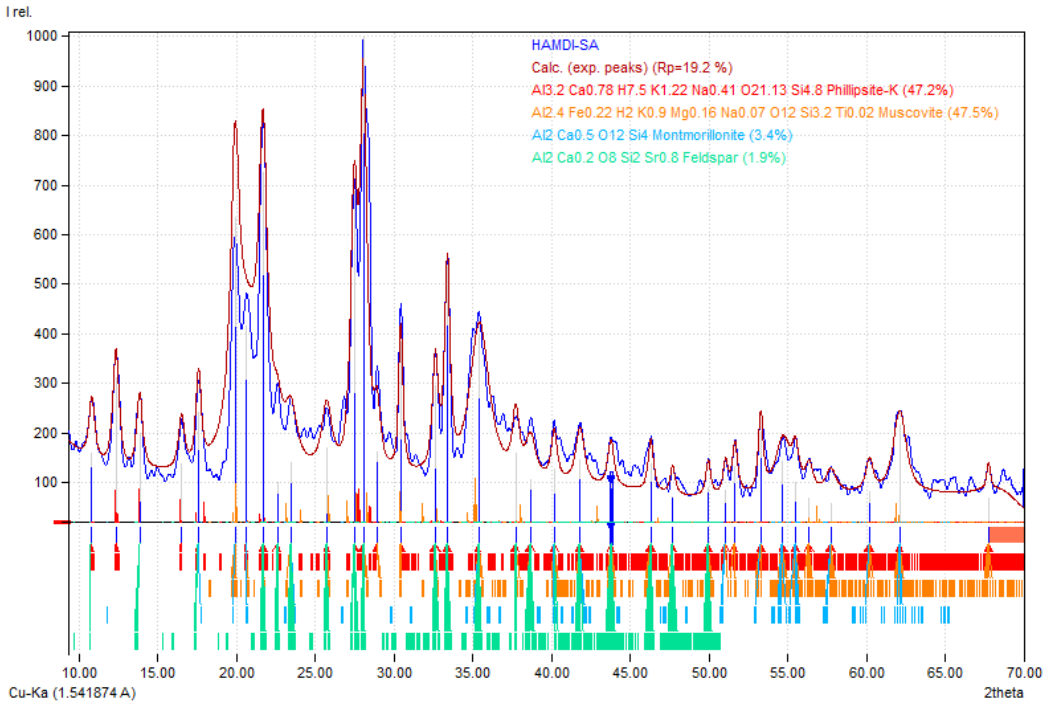
LAMPIRAN

Lampiran 1

Hasil analisis XRD

Sampel Awal

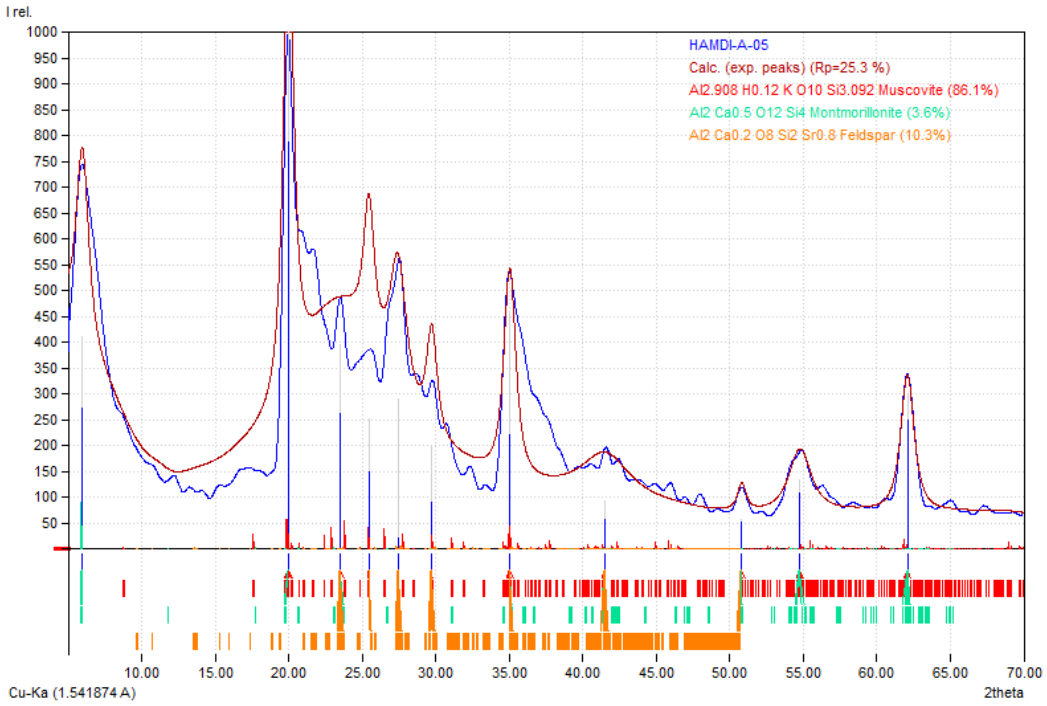


Index	Amount (%)	Name	Formula sum
A	47.2	Phillipsite-K	Al3.2 Ca0.78 H7.5 K1.22 Na0.41 O21.13 Si4.8
B	47.5	Muscovite	Al2.4 Fe0.22 H2 K0.9 Mg0.16 Na0.07 O12 Si3.2 Ti0.02
C	3.4	Montmorillonite	Al2 Ca0.5 O12 Si4
D	1.9	Feldspar	Al2 Ca0.2 O8 Si2 Sr0.8
	12.1	*Unidentified peak area*	

No.	2theta [°]	d[Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.8	15.2254	372.36	83.04	1.08	C
2	10.82	8.1702	160.05	14.54	0.44	A,D
3	12.36	7.1554	312.22	30.94	0.48	A
4	13.86	6.3842	197.75	17.97	0.44	A,D
5	16.52	5.3618	138.02	12.54	0.44	A
6	17.6	5.0351	240.62	19.87	0.4	A,C,D
7	19.92	4.4536	634.84	78.65	0.6	B,C
8	20.66	4.2957	414.59	184.9	2.16	A,B,C
9	21.7	4.0921	724.7	89.78	0.6	A,B,D
10	22.6	3.9312	100.95	15.01	0.72	A,B,D
11	23.46	3.789	139.56	25.36	0.88	B,C,D
12	25.74	3.4612	169.06	26.53	0.76	A,B,D
13	27.48	3.2431	688.83	73.96	0.52	A,B,D
14	28.08	3.1752	1000	107.37	0.52	A,B,D
15	28.94	3.0828	160.61	17.24	0.52	A,B
16	30.44	2.9342	382.39	25.27	0.32	A,B
17	32.64	2.7435	294.1	26.72	0.44	A,B,D
18	33.4	2.6828	539.13	44.53	0.4	A,D
19	35.44	2.5329	400.79	119.6	1.4453	A,B,C,D

20	37.74	2.3837	159.29	17.1	0.52	A,B,D
21	38.68	2.326	105.11	16.49	0.76	A,B,D
22	40.18	2.2425	127.27	11.56	0.44	A,B,C,D
23	41.82	2.1583	144.63	19.11	0.64	A,B,C,D
24	43.78	2.0661	120.09	11.9	0.48	A,B,D
25	46.32	1.9586	136.82	11.3	0.4	A,B,C,D
26	47.7	1.9066	71.85	5.44	0.3665	A,B,D
27	49.96	1.824	88.07	6.55	0.36	A,B,D
28	51.06	1.7873	84.56	6.29	0.36	A,B,C
29	51.66	1.7679	131.89	10.89	0.4	A,B
30	53.3	1.7174	202.93	15.08	0.36	A,B,C
31	54.7	1.678	143.55	33.2	1.12	A,B,C
32	55.5	1.6557	98.97	10.63	0.52	A,B,C
33	56.36	1.6325	68.66	7.94	0.56	A,B
34	57.76	1.5962	58.39	9.12	0.7564	A,B,C
35	60.2	1.5372	82.56	9.33	0.5474	A,B,C
36	62.12	1.4943	213.83	42.38	0.96	A,B,C
37	67.76	1.383	67.43	3.73	0.2676	A,B

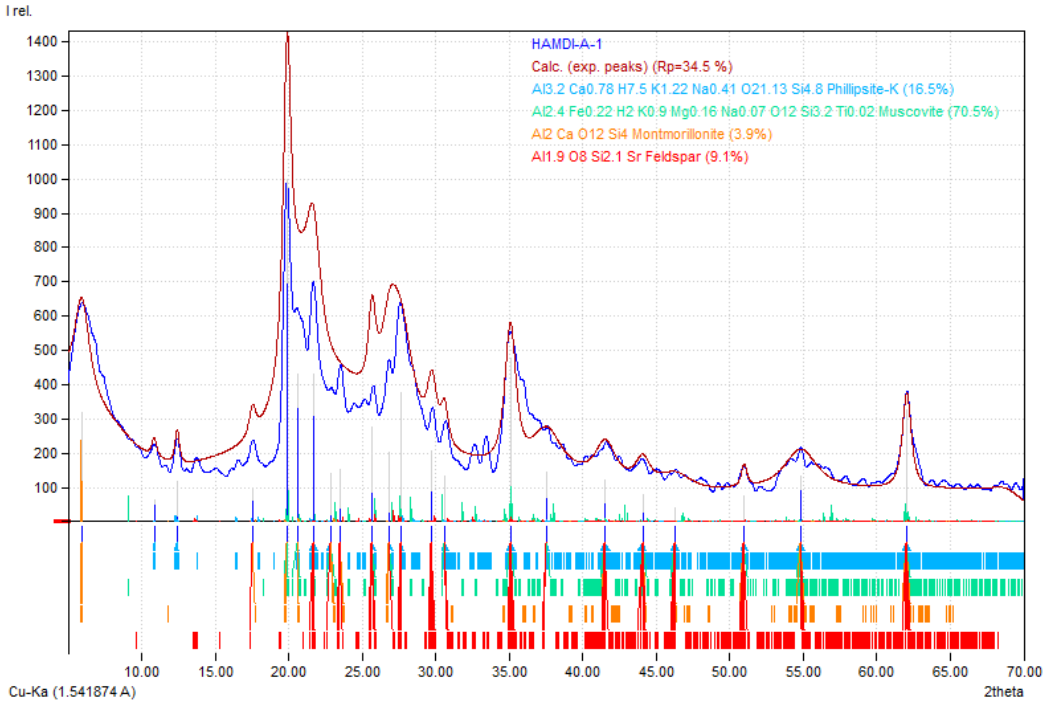
Zeolit A-0.5



Index	*Amount (%)*	*Name*	*Formula sum*
A	86.1	Muscovite	Al2.908 H0.12 K O10 Si3.092
B	3.6	Montmorillonite	Al2 Ca0.5 O12 Si4
C	10.3	Feldspar	Al2 Ca0.2 O8 Si2 Sr0.8
	10.9	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.98	14.7675	410.76	86.47	1	B
2	20	4.436	1000	176.83	0.84	A,B
3	23.5	3.7826	395.65	689.63	8.28	A,B,C
4	25.46	3.4986	251.33	51.24	0.84	A,C
5	27.44	3.2478	289.91	80.56	1.32	C
6	29.74	3.0041	197.57	40.28	0.84	A,B,C
7	35.04	2.5588	458.63	92.68	0.96	A,B,C
8	41.54	2.174	93.09	74.16	3.7844	A,B,C
9	50.82	1.7967	57.81	7.96	0.6539	A,B,C
10	54.78	1.6758	135.37	49.78	1.747	A,B
11	62.08	1.4939	298.82	67.94	1.08	A,B

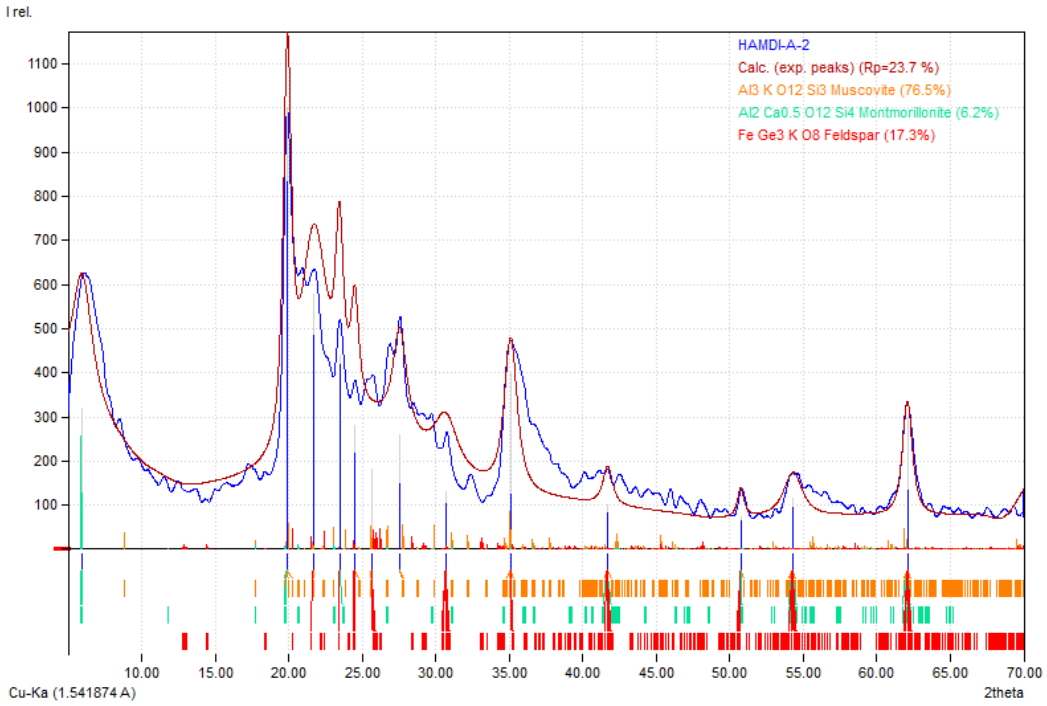
Zeolit A-1



Index	*Amount (%)*	*Name*	*Formula sum*
A	16.5	Phillipsite-K	Al3.2 Ca0.78 H7.5 K1.22 Na0.41 O21.13 Si4.8
B	70.5	Muscovite	Al2.4 Fe0.22 H2 K0.9 Mg0.16 Na0.07 O12 Si3.2 Ti0.02
C	3.9	Montmorillonite	Al2 Ca O12 Si4
D	9.1	Feldspar	Al1.9 O8 Si2.1 Sr
	12.1	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.94	14.8669	317.05	78.08	1.16	C
2	10.86	8.1469	62.38	4.98	0.3759	A
3	12.42	7.1269	116.87	8.74	0.3524	A
4	17.54	5.0564	97.27	11.04	0.5346	A,C,D
5	19.9	4.458	1000	127.38	0.6	B,C
6	20.58	4.3122	430.76	193.87	2.12	A,B,C
7	21.68	4.0959	429.61	105.8	1.16	A,B,D
8	22.84	3.8904	139.29	209.36	7.08	A,B,C,D
9	23.52	3.7794	154.02	269.43	8.24	C,D
10	25.68	3.4691	274.53	34.97	0.6	A,B,D
11	26.84	3.319	203.11	51.74	1.2	A,B,C,D
12	27.6	3.2293	375.83	156.38	1.96	A,B,D
13	29.74	3.0041	204.86	33.05	0.76	C,D
14	30.6	2.9216	133.89	17.06	0.6003	A,B,D
15	35.08	2.556	475.44	88.82	0.88	A,B,C,D
16	37.54	2.3939	144.77	72.53	2.36	A,B,D
17	41.54	2.174	122.32	40.23	1.5493	A,B,C,D
18	44.08	2.0544	80.39	18.25	1.0692	A,B,C,D
19	46.3	1.961	41.84	19.88	2.2378	A,B,C,D
20	50.98	1.7914	75.56	7.01	0.4372	A,B,C,D
21	54.82	1.6747	133.54	72.58	2.56	A,B,C,D
22	62.04	1.4947	327.89	50.12	0.72	A,B,C,D

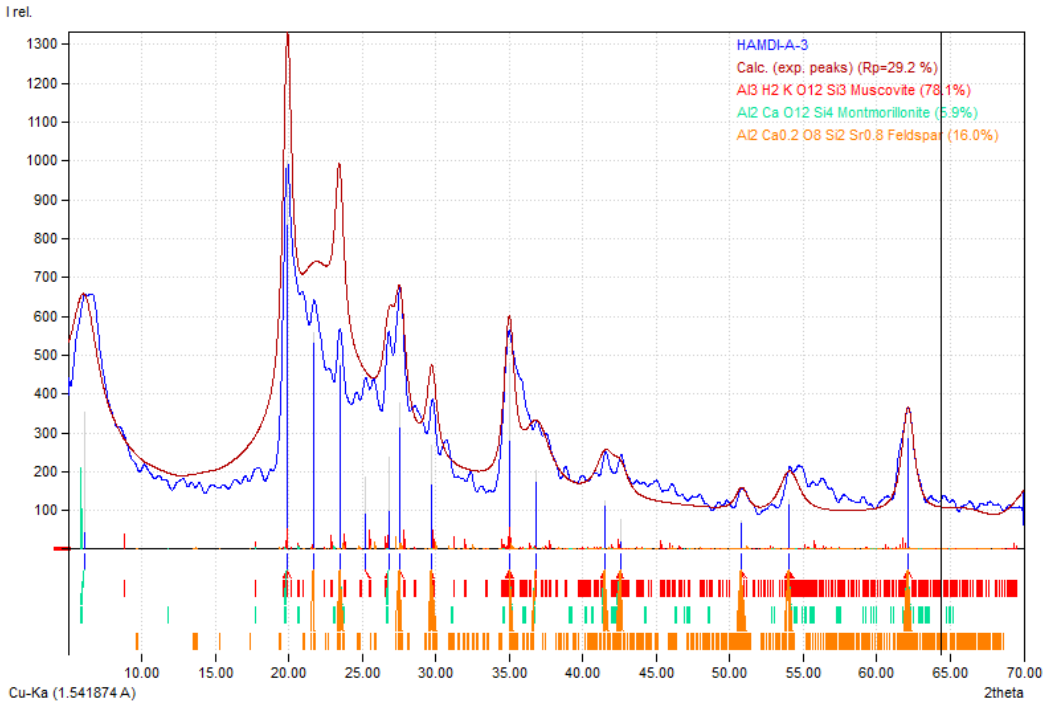
Zeolit A-2



Index	*Amount (%)*	*Name*	*Formula sum*
A	76.5	Muscovite	Al3 K O12 Si3
B	6.2	Montmorillonite	Al2 Ca0.5 O12 Si4
C	17.3	Feldspar	Fe Ge3 K O8
	13.0	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.96	14.8293	320.1	111.39	1.5613	B
2	19.92	4.4573	1000	142.63	0.6400	A,B,C
3	21.72	4.0918	576.98	283.08	2.2015	A,C
4	23.46	3.7921	439.98	62.76	0.6400	B,C
5	24.5	3.6335	279.26	39.83	0.6400	A,C
6	25.64	3.4716	181.27	340.97	8.4400	A,C
7	27.56	3.2339	258.44	62.2	1.0800	A,C
8	30.68	2.9142	131.84	53.32	1.8146	C
9	35.1	2.5567	397.34	92.1	1.0400	A,B,C
10	41.7	2.166	99.87	17.35	0.7794	A,B,C
11	50.74	1.7993	73.29	8.47	0.5189	A,B,C
12	54.3	1.6895	114.46	38.05	1.4916	A,B,C
13	62.08	1.4939	298.93	53.3	0.8000	A,B,C

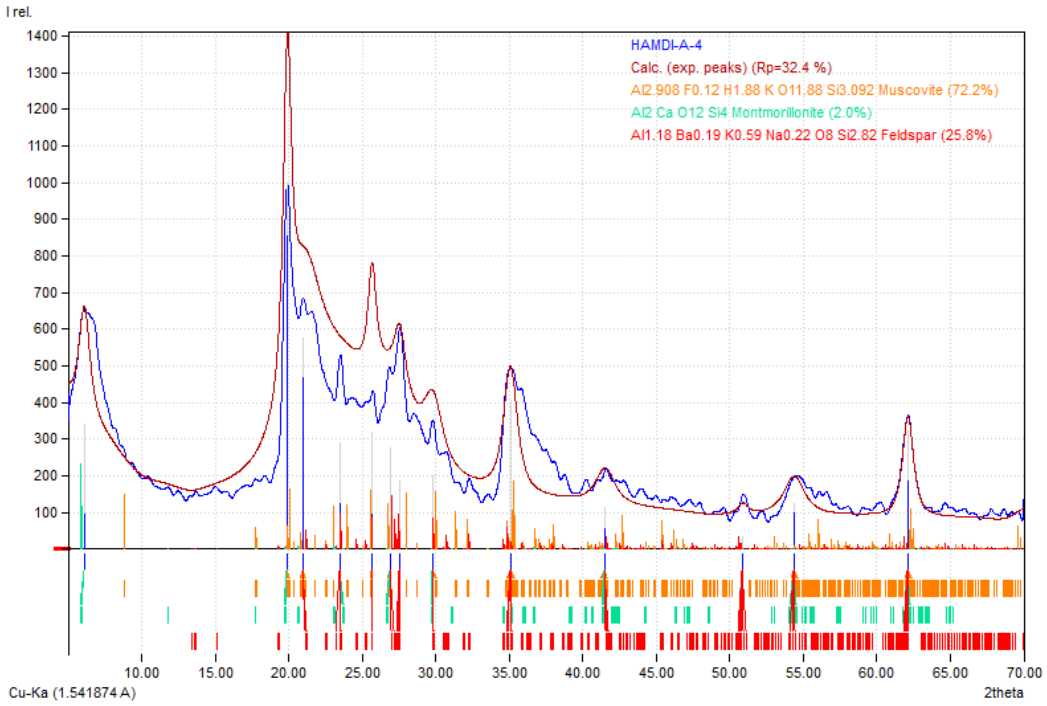
Zeolit A-3



Index	*Amount (%)*	*Name*	*Formula sum*
A	78.1	Muscovite	Al3 H2 K O12 Si3
B	5.9	Montmorillonite	Al2 Ca O12 Si4
C	16.0	Feldspar	Al2 Ca0.2 O8 Si2 Sr0.8
	11.6	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	6.1	14.4893	354.65	143.6	1.9706	B
2	19.92	4.4536	1000	139.72	0.6800	A,B,C
3	21.74	4.0847	556.71	498.71	4.3600	A,C
4	23.46	3.7921	479.05	66.93	0.6800	B,C
5	25.24	3.5257	186.46	309.56	8.0800	A,C
6	26.82	3.3214	236.11	40.75	0.8400	A,B,C
7	27.58	3.2316	375.66	67.92	0.8800	A,C
8	29.74	3.0041	266.15	41.56	0.7600	A,B,C
9	35	2.5616	477.9	78.55	0.8000	A,B,C
10	36.86	2.4365	201.39	91.03	2.2000	A,B,C
11	41.54	2.174	125.44	38.46	1.4921	A,B,C
12	42.58	2.1233	77.42	18.74	1.1781	A,B,C
13	50.82	1.7967	72.26	14.96	1.0078	A,B,C
14	54.06	1.6964	129.19	43.01	1.6203	A,B,C
15	62.12	1.493	321.34	66.02	1.0000	A,B,C

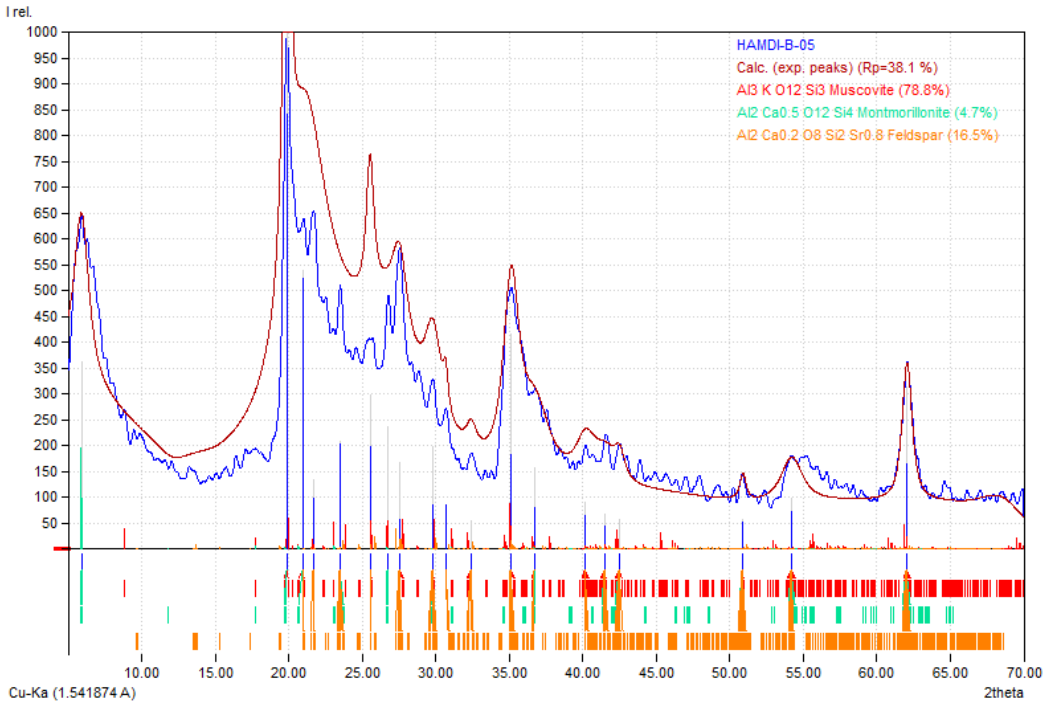
Zeolit A-4



Index	Amount (%)	Name	Formula sum
A	72.2	Muscovite	Al2.908 F0.12 H1.88 K O11.88 Si3.092
B	2.0	Montmorillonite	Al2 Ca O12 Si4
C	25.8	Feldspar	Al1.18 Ba0.19 K0.59 Na0.22 O8 Si2.82
	3.6	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	6.12	14.43	340.48	61.41	0.8800	B
2	19.92	4.4536	1000	131.17	0.6400	A,B
3	21	4.2269	577	350.03	2.9600	A,C
4	23.5	3.7826	290.26	299.82	5.0400	B,C
5	25.68	3.4691	317.93	41.7	0.6400	A,C
6	26.88	3.3142	277.34	243.28	4.2800	A,B,C
7	27.56	3.2339	186.58	33.65	0.8800	C
8	29.82	2.9962	201.81	61.78	1.4938	A,B,C
9	35.08	2.556	406.17	93.23	1.1200	A,B,C
10	41.54	2.174	113.43	35.34	1.5200	A,B,C
11	50.9	1.794	33.13	5.51	0.8110	B,C
12	54.38	1.6872	123.63	42.21	1.6659	A,B,C
13	62.12	1.493	322.61	58.18	0.8800	A,B,C

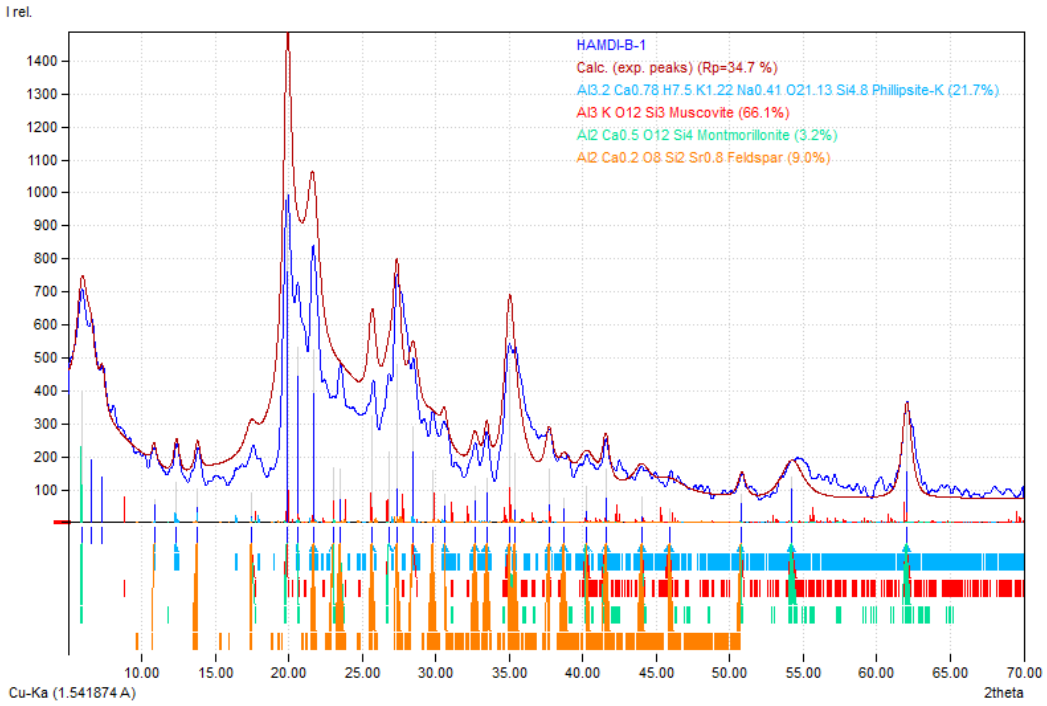
Zeolit B-0.5



Index	Amount (%)	Name	Formula sum
A	78.8	Muscovite	Al3 K O12 Si3
B	4.7	Montmorillonite	Al2 Ca0.5 O12 Si4
C	16.5	Feldspar	Al2 Ca0.2 O8 Si2 Sr0.8
	12.6	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.92	14.9171	361.57	89.99	1.1600	B
2	19.88	4.4625	1000	128.74	0.6000	A,B,C
3	20.98	4.2309	539.25	356.37	3.0800	A,B
4	21.68	4.0959	134.22	119.81	4.1600	A,C
5	23.5	3.7826	208.1	367.93	8.2400	B,C
6	25.54	3.4878	299.69	38.58	0.6000	A,C
7	26.78	3.3263	237.09	229.94	4.5200	A,B,C
8	27.54	3.2362	168.86	42.03	1.1600	A,C
9	29.82	2.9962	199.23	56.09	1.3121	A,B,C
10	30.68	2.9142	85.35	7.2	0.3932	C
11	32.42	2.7616	54.32	9.52	0.8166	A
12	35.14	2.5518	417.71	111.14	1.2400	A,B,C
13	36.76	2.4429	158.42	77.5	2.2800	A,B,C
14	40.2	2.2433	92.31	30.5	1.5400	A,B,C
15	41.54	2.174	67.4	25.62	1.7714	A,B,C
16	42.5	2.1271	56.97	10.19	0.8334	A,B,C
17	50.9	1.794	58.13	6.05	0.4851	A,B,C
18	54.22	1.6918	99.33	36.09	1.6933	A,B,C
19	62.06	1.4943	313.9	53.88	0.8000	A,B,C

Zeolit B-1

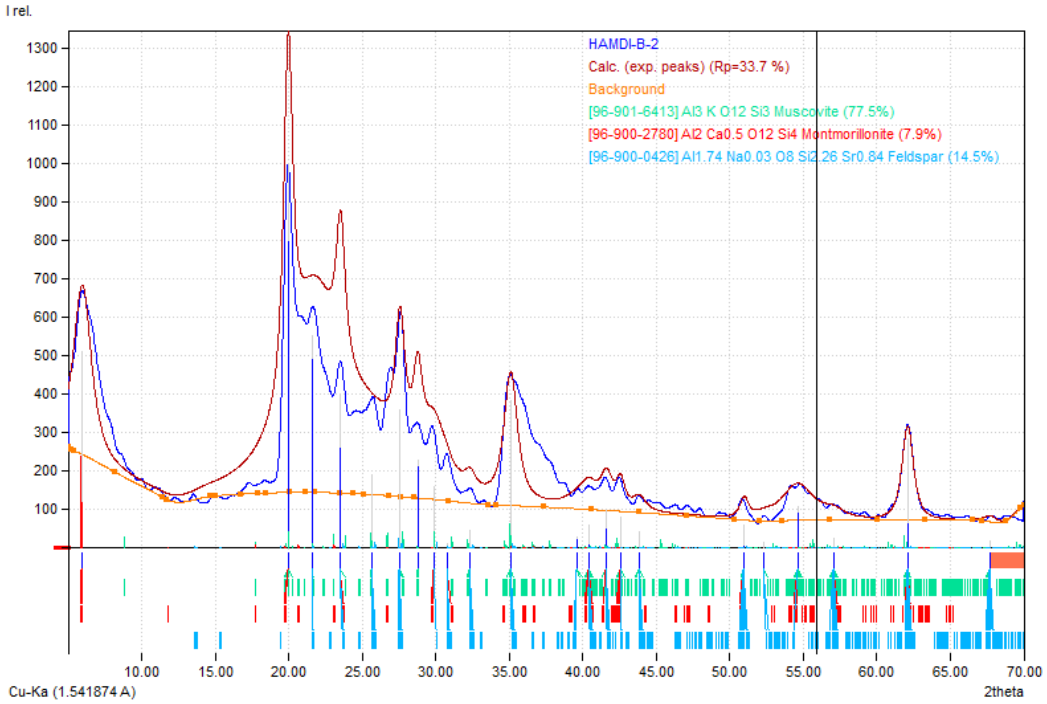


Index	Amount (%)	Name	Formula sum
A	16.5	Phillipsite-K	Al3.2 Ca0.78 H7.5 K1.22 Na0.41 O21.13 Si4.8
B	70.5	Muscovite	Al2.4 Fe0.22 H2 K0.9 Mg0.16 Na0.07 O12 Si3.2 Ti0.02
C	3.9	Montmorillonite	Al2 Ca O12 Si4
D	9.1	Feldspar	Al1.9 O8 Si2.1 Sr
	12.1	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.96	14.817	394.42	67.49	0.88	C
4	10.86	8.1469	68.39	4.53	0.3404	A
5	12.38	7.1498	123.63	10.69	0.4448	A
6	13.8	6.4172	104.1	8.37	0.4137	A,D
7	17.44	5.0851	90.78	16.62	0.9414	A,B,C
8	19.92	4.4536	1000	124.44	0.64	B,C,D
9	20.6	4.3081	532.77	227.9	2.2	A,B,C
10	21.68	4.0959	525.82	98.15	0.96	A,B,D
11	23.02	3.8604	167.36	238.2	7.32	A,B,C,D
12	23.52	3.7794	163.88	159.33	5	C,D
13	25.68	3.4691	321.5	40.01	0.64	A,B,D
14	26.82	3.3214	213.07	48.06	1.16	A,B,C,D
15	27.38	3.2548	480.71	59.82	0.64	A,D
16	28.46	3.1362	292.87	50.11	0.88	A,B,D
17	29.8	2.9982	157.99	71.27	2.32	B,C,D
18	30.6	2.9216	87.33	7.79	0.459	A,D
19	32.66	2.7419	111.78	13.62	0.6265	A,D
20	33.46	2.6781	134.53	11.51	0.44	A,B,D

21	35.02	2.5602	463.33	68.47	0.76	A,B,C,D
22	35.38	2.535	208.84	61.72	1.52	A,B,C,D
23	37.72	2.3849	163.25	20.31	0.64	A,B,D
24	38.76	2.3233	75.39	12.91	0.8807	A,B,D
25	40.28	2.239	108.82	28.78	1.36	A,B,C,D
26	41.58	2.172	161.04	17.54	0.56	A,B,C,D
27	44	2.058	77.74	19.2	1.2699	A,B,C,D
28	45.9	1.9771	43.55	18.8	2.2207	A,B,D
29	50.82	1.7967	86.26	10.32	0.6151	A,B,C,D
30	54.24	1.6898	136.87	46.84	1.76	A,B,C,D
31	62.04	1.4947	337.38	49.86	0.76	A,B,C,D

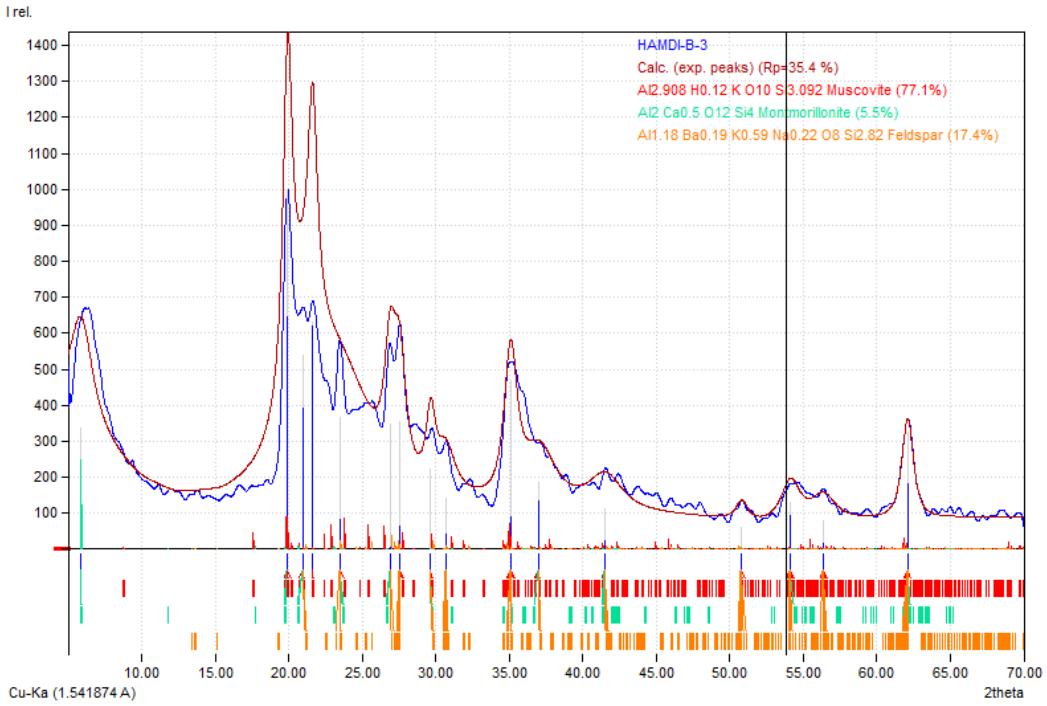
Zeolit B-2



Index	Amount (%)	Name	Formula sum
A	77.5	Muscovite	Al3 K O12 Si3
B	7.9	Montmorillonite	Al2 Ca0.5 O12 Si4
C	14.5	Feldspar	Al1.74 Na0.03 O8 Si2.26 Sr0.84
	14.1	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.98	14.7675	510.5	176.92	1.4400	B
2	19.98	4.4404	1000	173.29	0.7200	A,B,C
3	21.64	4.1034	553.51	570.16	4.2800	A,C
4	23.46	3.7921	398.57	69.07	0.7200	B,C
5	25.66	3.4689	192.42	324.18	7.0000	A,C
6	27.58	3.2316	358.39	65.55	0.7600	A,C
7	29.74	3.0041	221.39	51.15	0.9600	A,B,C
8	30.68	2.9142	139.88	33.67	1.0000	C
9	35.1	2.5546	383.25	99.62	1.0800	A,B,C
10	41.46	2.178	41.08	19.15	1.9368	A,B,C
11	42.5	2.1271	82.2	42.79	2.1627	A,B,C
12	50.82	1.7967	63.22	10.38	0.6820	A,B,C
13	54.14	1.6941	98.44	43.96	1.8554	A,B,C
14	62.1	1.4934	283.49	62.77	0.9200	A,B,C

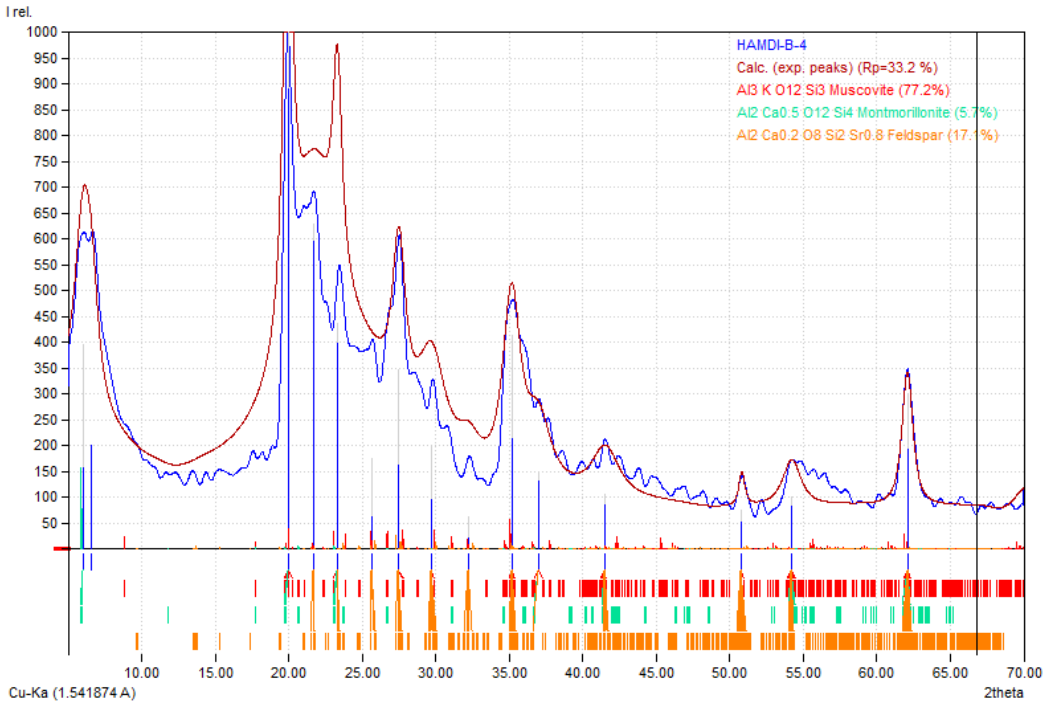
Zeolit B-3



Index	Amount (%)	Name	Formula sum
A	77.1	Muscovite	Al2.908 H0.12 K O10 Si3.092
B	5.5	Montmorillonite	Al2 Ca0.5 O12 Si4
C	17.4	Feldspar	Al1.18 Ba0.19 K0.59 Na0.22 O8 Si2.82
	11.1	Unidentified peak area	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	5.88	15.0309	335.74	121.64	1.8053	B
2	19.94	4.4492	1000	144.5	0.7200	A,B,C
3	20.94	4.2389	539.2	324.63	3.0000	A,B
4	21.64	4.1068	630.97	91.17	0.7200	A,C
5	23.48	3.7858	367.74	377.87	5.1200	A,B,C
6	26.9	3.3117	348.69	61.58	0.8800	B,C
7	27.56	3.2339	353.56	68.12	0.9600	A,C
8	29.66	3.012	223.65	32.32	0.7200	A,B
9	30.68	2.9142	142.65	41.83	1.4613	C
10	35.1	2.5546	469.47	97.98	1.0400	A,B,C
11	37.02	2.4264	185.01	100.99	2.7200	A,B,C
12	41.54	2.174	111.96	59.61	2.6530	A,B,C
13	50.82	1.7967	61.71	11.69	0.9436	A,B,C
14	54.14	1.6941	129.04	38.64	1.4922	A,B,C
15	56.36	1.6325	80.32	30.37	1.8841	A,C
16	62.1	1.4934	323.91	59.8	0.9200	A,B,C

Zeolit B-4



Index	*Amount (%)*	*Name*	*Formula sum*
A	77.2	Muscovite	Al3 K O12 Si3
B	5.7	Montmorillonite	Al2 Ca0.5 O12 Si4
C	17.1	Feldspar	Al2 Ca0.2 O8 Si2 Sr0.8
	14.5	*Unidentified peak area*	

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	6.02	14.6695	395.58	106.94	1.2800	B
3	19.96	4.4448	1000	152.07	0.7200	A,B,C
4	21.66	4.0996	628.56	584.12	4.4000	A,C
5	23.32	3.8146	437.72	66.56	0.7200	A,B,C
6	25.64	3.4716	175.52	265.42	7.1600	A,C
7	27.5	3.2435	347.12	73.31	1.0000	A,C
8	29.74	3.0041	201.48	86.5	2.0328	A,B,C
9	32.26	2.775	63.14	22.89	1.7164	A
10	35.16	2.5525	413.76	122.34	1.4000	A,B,C
11	36.98	2.4309	147.55	61.08	1.9600	A,B,C
12	41.54	2.174	106.02	47.6	2.1256	A,B,C
13	50.82	1.7967	75.07	7.52	0.4740	A,B,C
14	54.22	1.6918	102.34	31.26	1.4461	A,B,C
15	62.08	1.4939	302.5	56.22	0.8800	A,B,C

Lampiran 2

Hasil analisis XRF

Sample : Hamdi-Sampel-Awal
Operator: Zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:02:09

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	52.555 %	[0.537]	Quan-FP	SiKa	1.2010
Al2O3	37.388 %	[1.188]	Quan-FP	AlKa	0.0907
K2O	3.033 %	[0.023]	Quan-FP	K Ka	2.1039
BaO	2.639 %	[0.040]	Quan-FP	BaLa	7.0777
Fe2O3	2.123 %	[0.014]	Quan-FP	FeKa	44.7156
CaO	1.871 %	[0.014]	Quan-FP	CaKa	1.8770
SrO	0.147 %	[0.001]	Quan-FP	SrKa	18.0647
TiO2	0.141 %	[0.024]	Quan-FP	TiKa	0.7588
Rb2O	0.033 %	[0.001]	Quan-FP	RbKa	3.9688
ZrO2	0.029 %	[0.001]	Quan-FP	ZrKa	3.6720
Ag2O	0.023 %	[0.002]	Quan-FP	AgKa	1.5980
ZnO	0.013 %	[0.001]	Quan-FP	ZnKa	0.5911
Y2O3	0.003 %	[0.001]	Quan-FP	Y Ka	0.3746

Sample : Hamdi-A-0-5
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:10:59

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	63.040 %	[0.551]	Quan-FP	SiKa	1.5434
Al2O3	31.790 %	[1.021]	Quan-FP	AlKa	0.0811
Fe2O3	2.558 %	[0.014]	Quan-FP	FeKa	64.9144
K2O	1.583 %	[0.016]	Quan-FP	K Ka	1.0883
TiO2	0.487 %	[0.011]	Quan-FP	TiKa	2.8523
BaO	0.220 %	[0.032]	Quan-FP	BaLa	0.6423
CaO	0.185 %	[0.003]	Quan-FP	CaKa	0.1919
SrO	0.082 %	[0.001]	Quan-FP	SrKa	12.2787
ZrO2	0.034 %	[0.001]	Quan-FP	ZrKa	5.2973
Rb2O	0.010 %	[0.001]	Quan-FP	RbKa	1.5171
ZnO	0.010 %	[0.001]	Quan-FP	ZnKa	0.5221

Sample : Hamdi-A-1
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:18:39

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	60.210 %	[0.557]	Quan-FP	SiKa	1.4263
Al2O3	33.160 %	[1.063]	Quan-FP	AlKa	0.0819
Fe2O3	2.603 %	[0.016]	Quan-FP	FeKa	61.0909
K2O	1.959 %	[0.018]	Quan-FP	K Ka	1.3345
BaO	1.165 %	[0.022]	Quan-FP	BaLa	3.2910
CaO	0.408 %	[0.006]	Quan-FP	CaKa	0.4141
TiO2	0.319 %	[0.006]	Quan-FP	TiKa	1.8095
SrO	0.091 %	[0.001]	Quan-FP	SrKa	12.4682
ZrO2	0.033 %	[0.001]	Quan-FP	ZrKa	4.6533
Rb2O	0.021 %	[0.001]	Quan-FP	RbKa	2.8260
Ag2O	0.020 %	[0.002]	Quan-FP	AgKa	1.4943
ZnO	0.011 %	[0.001]	Quan-FP	ZnKa	0.5285

Sample : Hamdi-A-2
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:26:15

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	65.710 %	[0.551]	Quan-FP	SiKa	1.5660
Al2O3	29.742 %	[0.964]	Quan-FP	AlKa	0.0726
Fe2O3	2.359 %	[0.014]	Quan-FP	FeKa	57.6343
K2O	1.386 %	[0.014]	Quan-FP	K Ka	0.9062
TiO2	0.458 %	[0.011]	Quan-FP	TiKa	2.5709
BaO	0.195 %	[0.032]	Quan-FP	BaLa	0.5445
SrO	0.068 %	[0.001]	Quan-FP	SrKa	9.8469
ZrO2	0.034 %	[0.001]	Quan-FP	ZrKa	5.0804
CaO	0.031 %	[0.020]	Quan-FP	CaKa	0.0849
ZnO	0.009 %	[0.001]	Quan-FP	ZnKa	0.4764
Rb2O	0.008 %	[0.001]	Quan-FP	RbKa	1.1181

Sample : Hamdi-A-3
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:33:57

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	65.063 %	[0.546]	Quan-FP	SiKa	1.5643
Al2O3	29.962 %	[0.959]	Quan-FP	AlKa	0.0738
Fe2O3	2.369 %	[0.014]	Quan-FP	FeKa	57.8442
K2O	1.586 %	[0.015]	Quan-FP	K Ka	1.0499
TiO2	0.458 %	[0.010]	Quan-FP	TiKa	2.5798
BaO	0.278 %	[0.032]	Quan-FP	BaLa	0.7811
CaO	0.167 %	[0.006]	Quan-FP	CaKa	0.1665
SrO	0.064 %	[0.001]	Quan-FP	SrKa	9.2888
ZrO2	0.035 %	[0.001]	Quan-FP	ZrKa	5.2076
Rb2O	0.010 %	[0.001]	Quan-FP	RbKa	1.3685
ZnO	0.009 %	[0.001]	Quan-FP	ZnKa	0.4506

Sample : Hamdi-A-4
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:41:33

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	64.447 %	[0.546]	Quan-FP	SiKa	1.5324
Al2O3	30.965 %	[0.994]	Quan-FP	AlKa	0.0764
Fe2O3	2.275 %	[0.014]	Quan-FP	FeKa	56.4264
K2O	1.534 %	[0.015]	Quan-FP	K Ka	1.0115
TiO2	0.568 %	[0.013]	Quan-FP	TiKa	3.2151
SrO	0.063 %	[0.001]	Quan-FP	SrKa	9.2995
MnO	0.052 %	[0.003]	Quan-FP	MnKa	1.0240
V2O5	0.043 %	[0.007]	Quan-FP	V Ka	0.3279
ZrO2	0.034 %	[0.001]	Quan-FP	ZrKa	5.2448
Rb2O	0.010 %	[0.001]	Quan-FP	RbKa	1.4260
ZnO	0.009 %	[0.001]	Quan-FP	ZnKa	0.4820

Sample : Hamdi-B-0-5
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:49:10

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	64.393 %	[0.559]	Quan-FP	SiKa	1.5075
Al2O3	30.764 %	[1.008]	Quan-FP	AlKa	0.0744
Fe2O3	2.427 %	[0.014]	Quan-FP	FeKa	58.5244
K2O	1.426 %	[0.015]	Quan-FP	K Ka	0.9266
TiO2	0.435 %	[0.010]	Quan-FP	TiKa	2.4178
BaO	0.226 %	[0.032]	Quan-FP	BaLa	0.6249
CaO	0.190 %	[0.007]	Quan-FP	CaKa	0.1866
SrO	0.072 %	[0.001]	Quan-FP	SrKa	10.2036
ZrO2	0.033 %	[0.001]	Quan-FP	ZrKa	4.8938
Ag2O	0.013 %	[0.002]	Quan-FP	AgKa	1.0327
Rb2O	0.010 %	[0.001]	Quan-FP	RbKa	1.4482
ZnO	0.010 %	[0.001]	Quan-FP	ZnKa	0.4908

Sample : Hamdi-B-1
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 11:56:56

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	61.238 %	[0.557]	Quan-FP	SiKa	1.4218
Al2O3	32.363 %	[1.051]	Quan-FP	AlKa	0.0776
Fe2O3	2.366 %	[0.015]	Quan-FP	FeKa	53.6010
K2O	1.788 %	[0.017]	Quan-FP	K Ka	1.1842
BaO	1.436 %	[0.026]	Quan-FP	BaLa	3.9524
CaO	0.413 %	[0.006]	Quan-FP	CaKa	0.4099
TiO2	0.242 %	[0.020]	Quan-FP	TiKa	1.3401
SrO	0.084 %	[0.001]	Quan-FP	SrKa	11.1261
ZrO2	0.033 %	[0.001]	Quan-FP	ZrKa	4.4966
Rb2O	0.023 %	[0.001]	Quan-FP	RbKa	3.0045
ZnO	0.010 %	[0.001]	Quan-FP	ZnKa	0.4808
Y2O3	0.003 %	[0.001]	Quan-FP	Y Ka	0.4315

Sample : Hamdi-B-2
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 12:04:44

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	65.178 %	[0.552]	Quan-FP	SiKa	1.5540
Al2O3	30.271 %	[0.998]	Quan-FP	AlKa	0.0743
Fe2O3	2.269 %	[0.014]	Quan-FP	FeKa	55.6343
K2O	1.364 %	[0.014]	Quan-FP	K Ka	0.8965
TiO2	0.439 %	[0.010]	Quan-FP	TiKa	2.4695
BaO	0.204 %	[0.031]	Quan-FP	BaLa	0.5721
CaO	0.163 %	[0.006]	Quan-FP	CaKa	0.1626
SrO	0.063 %	[0.001]	Quan-FP	SrKa	9.2403
ZrO2	0.033 %	[0.001]	Quan-FP	ZrKa	4.9431
ZnO	0.008 %	[0.001]	Quan-FP	ZnKa	0.4270
Rb2O	0.008 %	[0.001]	Quan-FP	RbKa	1.1411

Sample : Hamdi-B-3
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 12:12:14

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	65.033 %	[0.556]	Quan-FP	SiKa	1.5142
Al2O3	30.161 %	[0.968]	Quan-FP	AlKa	0.0722
Fe2O3	2.313 %	[0.014]	Quan-FP	FeKa	55.0427
K2O	1.548 %	[0.015]	Quan-FP	K Ka	0.9934
TiO2	0.481 %	[0.011]	Quan-FP	TiKa	2.6353
BaO	0.213 %	[0.032]	Quan-FP	BaLa	0.5814
CaO	0.137 %	[0.006]	Quan-FP	CaKa	0.1332
SrO	0.062 %	[0.001]	Quan-FP	SrKa	8.7003
ZrO2	0.036 %	[0.001]	Quan-FP	ZrKa	5.2107
Rb2O	0.008 %	[0.001]	Quan-FP	RbKa	1.1361
ZnO	0.008 %	[0.001]	Quan-FP	ZnKa	0.3856

Sample : Hamdi-B-4
Operator: zahran
Comment : Quick&easy Air-Metal
Group : easy-oxide
Date : 2024-04-20 12:19:58

Quantitative Result

Analyte	Result	[3-sigma]	Proc.-Calc.	Line	Int.(cps/uA)
SiO2	66.956 %	[0.533]	Quan-FP	SiKa	1.5803
Al2O3	28.681 %	[0.899]	Quan-FP	AlKa	0.0687
Fe2O3	2.081 %	[0.013]	Quan-FP	FeKa	49.7324
K2O	1.386 %	[0.014]	Quan-FP	K Ka	0.8855
TiO2	0.476 %	[0.011]	Quan-FP	TiKa	2.6062
BaO	0.183 %	[0.031]	Quan-FP	BaLa	0.4978
CaO	0.137 %	[0.006]	Quan-FP	CaKa	0.1324
SrO	0.049 %	[0.001]	Quan-FP	SrKa	7.1091
ZrO2	0.035 %	[0.001]	Quan-FP	ZrKa	5.1668
Rb2O	0.008 %	[0.001]	Quan-FP	RbKa	1.1220
ZnO	0.008 %	[0.001]	Quan-FP	ZnKa	0.4106

Lampiran 3

Perhitungan pengenceran HCl

Rumus Mencari Volume HCl dengan konsentrasi yang diinginkan

$$V_1 . M_1 = V_2 . M_2$$

Atau

$$V_1 = \frac{V_2 . M_2}{M_1}$$

Keterangan:

V_1 = Volume larutan sebelum diencerkan (ml)

M_1 = Molaritas larutan sebelum diencerkan (M) (12 M)

V_2 = Volume larutan setelah diencerkan (mL) (450 ml)

M_2 = Molaritas larutan setelah diencerkan (M)

1. HCl 0,5 Molar

$$V_1 = \frac{450 \times 0.5}{12}$$

$$V_1 = 18.75$$

2. HCl 1 Molar

$$V_1 = \frac{450 \times 1}{12}$$

$$V_1 = 37.5$$

3. HCl 2 Molar

$$V_1 = \frac{450 \times 2}{12}$$

$$V_1 = 75$$

4. HCl 3 Molar

$$V_1 = \frac{450 \times 3}{12}$$

$$V_1 = 112.5$$

5. HCl 4 Molar

$$V_1 = \frac{450 \times 4}{12}$$

$$V_1 = 150$$

Lampiran 4

Perhitungan komposisi Si dan Al

Rumus mencari persentase Si dalam SiO_2

$$Si = \frac{Ar\ Si}{Mr\ SiO_2} \times \%\mathrm{Si}O_2$$

$$Si = \frac{Ar\ Si}{Ar\ Si + (2\ \times Ar\ O)} \times \%\mathrm{Si}O_2$$

Rumus mencari persentase Al dalam Al_2O_3

$$Al = \frac{Ar\ Al}{Mr\ Al_2O_3} \times \%Al_2O_3$$

$$Al = \frac{Ar\ Al}{(2 \times Ar\ Al) + (3\ \times Ar\ O)} \times \%Al_2O_3$$

Diketahui:

Ar Si = 28.085

Ar Al = 26.982

Ar O =15.999

1. Zeolit Awal

$$Si = \frac{28.085}{28.085 + (2\ \times 15.999)} \times 52.56\%$$

$$Si = 24.57\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3\ \times 15.999)} \times 37.39\%$$

$$Al = \ 19.79\%$$

2. Zeolit A-0.5

$$Si = \frac{28.085}{28.085 + (2\ \times 15.999)} \times 63.04\%$$

$$Si = 29.47\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3\ \times 15.999)} \times 31.79\%$$

$$Al = \ 16.83\%$$

3. Zeolit A-1

$$Si = \frac{28.085}{28.085 + (2\ \times 15.999)} \times 60.21\%$$

$$Si = 28.14\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 33.16\%$$

$$Al = 17.55\%$$

4. Zeolit A-2

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 65.71\%$$

$$Si = 30.72\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 29.74\%$$

$$Al = 15.74\%$$

5. Zeolit A-3

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 65.06\%$$

$$Si = 30.41\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 29.96\%$$

$$Al = 15.86\%$$

6. Zeolit A-4

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 64.45\%$$

$$Si = 30.12\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 30.97\%$$

$$Al = 16.39\%$$

7. Zeolit B-0.5

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 64.39\%$$

$$Si = 30.10\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 30.76\%$$

$$Al = 16.28\%$$

8. Zeolit B-1

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 61.24\%$$

$$Si = 28.62\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 32.36\%$$

$$Al = 17.13\%$$

9. Zeolit B-2

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 65.18\%$$

$$Si = 30.47\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 30.27\%$$

$$Al = 16.02\%$$

10. Zeolit B-3

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 65.03\%$$

$$Si = 30.40\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 30.16\%$$

$$Al = 15.96\%$$

11. Zeolit B-4

$$Si = \frac{28.085}{28.085 + (2 \times 15.999)} \times 66.96\%$$

$$Si = 31.30\%$$

$$Al = \frac{26.982}{(2 \times 26.982) + (3 \times 15.999)} \times 28.68\%$$

$$Al = 15.18\%$$

Lampiran 5

Kartu Konsultasi Tugas Akhir

Lampiran B 10

Kartu Konsultasi Tugas Akhir

JUDUL: DEALUMINASI ZEOLIT MONTMORILLONIT, KABUPATEN MAROS, PROVINSI SULAWESI SELATAN SECARA KIMIA MENGGUNAKAN ASAM KLORIDA

(Konsultasi minimal 8 kali)

TANGGAL	MATERI KONSULTASI	PARAF DOSEN
24/06/2024	- Hasil analisis XRF - Hasil analisis XRD	
28/06/2024	- Abstrak - Bab I (Latar Belakang)	
11/07/2024	- Perbaikan hasil analisis XRD - Grafik rasio Si/Al	
25/07/2024	- Hasil dan Pembahasan - Kesimpulan	

TANGGAL	MATERI KONSULTASI	PARAF DOSEN
06/08/2024	- Poster ilmiah - Artikel ilmiah	
12/08/2024	- Artikel ilmiah	
19/08/2024	- Artikel ilmiah	
28/09/2024	- Abstrak - Bab III	
08/10/2024	- Gambar 2 dan 3 - Revisi antara H+ dengan Si-O dan Al-O - Abstrak	
09/10/2024	- Penjelasan materi FTIR dengan jurnal	