

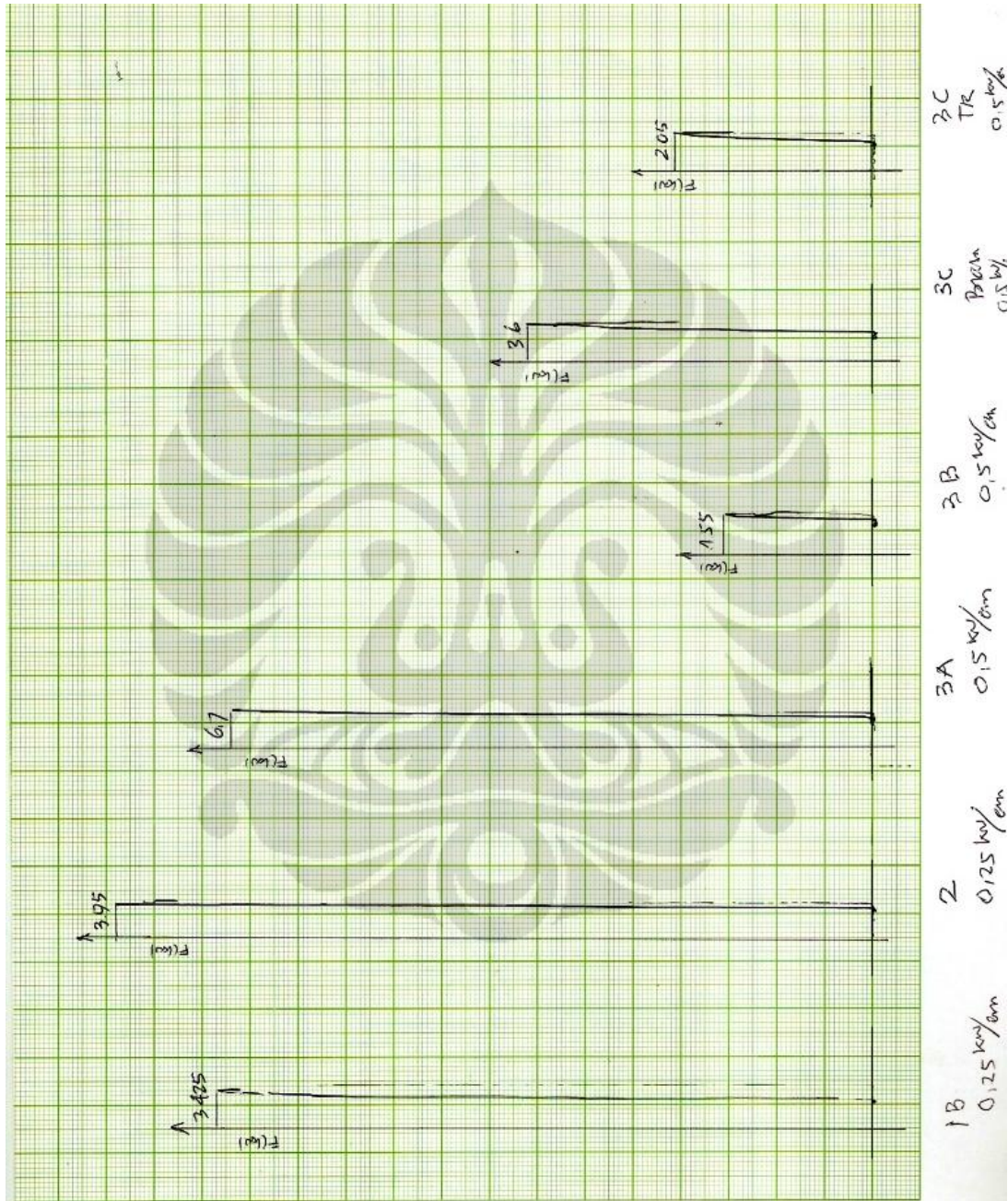
Lampiran 1
Lembar Perhitungan Kuat Tekan 26 Sampel

No. Sample	Komposisi (%b)				Beban Max.	Luas Perm. (cm ²)	Kuat Tekan Kg/cm ²	Mpa			
	Abu Terbang	NaOH	Na ₂ SiO ₃	H ₂ O							
1A	31	7	41	21	0.8	14.29	5.71	0.57	1000	9.81	10
1B	31	7	41	21	3.425	14	24.94	2.49	1000	9.81	10
2	31.25	7.5	40.25	21	3.95	14.22	28.32	2.83	1000	9.81	10
3A	36	7	37	20	6.7	14.03	48.68	4.87	1000	9.81	10
3B	32	6	40	22	1.55	14.18	11.14	1.11	1000	9.81	10
3C	32	5	41	22	3.6	13.91	26.38	2.64	1000	9.81	10
3C (Tr)	32	5	41	22	2.05	13.9	15.03	1.50	1000	9.81	10
3D	33	3	41.25	22.3	2.75	13.83	20.27	2.03	1000	9.81	10
3D (Tr)	33	3	41.25	22.3	2.55	14.16	18.36	1.84	1000	9.81	10
3E	33.75	1.5	42	22.8	1.6	14.39	11.33	1.13	1000	9.81	10
3F	34	0	43	23	1.15	14.4	8.14	0.81	1000	9.81	10
4A	33.75	3.25	40.25	22.8	1.2	14.31	8.55	0.85	1000	9.81	10
4B	34.25	3.25	39.25	23.3	2.1	13.95	15.35	1.53	1000	9.81	10
4C	35	3.25	38.25	23.5	1.9	14.05	13.79	1.38	1000	9.81	10
4D	35	3.25	37.25	24	3.7	13.95	27.04	2.70	1000	9.81	10
4E	36	3.5	36	24.5	4.9	13.92	35.88	3.59	1000	9.81	10
5A	40	2.5	13	44.5	5.9	24.1	24.96	2.50	1000	9.81	10
5A(Tr)	40	2.5	13	44.5	4.7	23.14	20.70	2.07	1000	9.81	10
5B	40	2.5	13	44.5	5.35	19.97	27.31	2.73	1000	9.81	10
5B(Tr)	40	2.5	13	44.5	4.7	24.16	19.83	1.98	1000	9.81	10
6A	40	11.42	20	28.6	5.25	20.25	26.43	2.64	1000	9.81	10
6B	40	11.42	20	28.6	7.9	19.96	40.35	4.03	1000	9.81	10
7	39.93	0.15	19.96	39.9	6.8	20.1	34.49	3.45	1000	9.81	10
8	40.2	12.58	15.73	31.5	7.9	25.18	31.98	3.20	1000	9.81	10
9A	37.85	18.02	9.01	35.1	0.85	25	3.47	0.35	1000	9.81	10
9C	37.5	17.86	8.93	35.7	1.7	25	6.93	0.69	1000	9.81	10

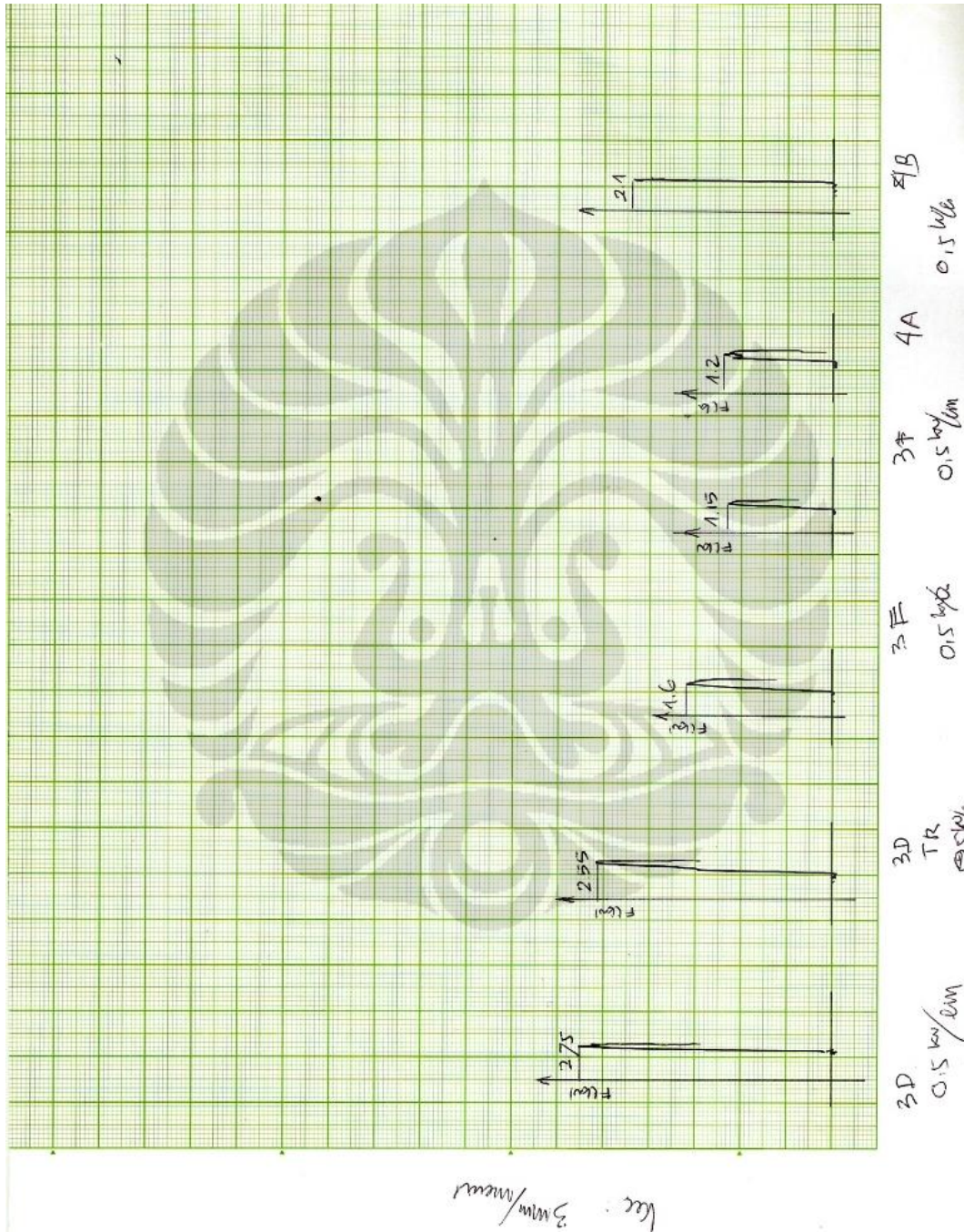
1 Mpa=10 Kg/cm²

Kuat Tekan (Kg/cm²)= beban max*1000/9.81/luas permukaan

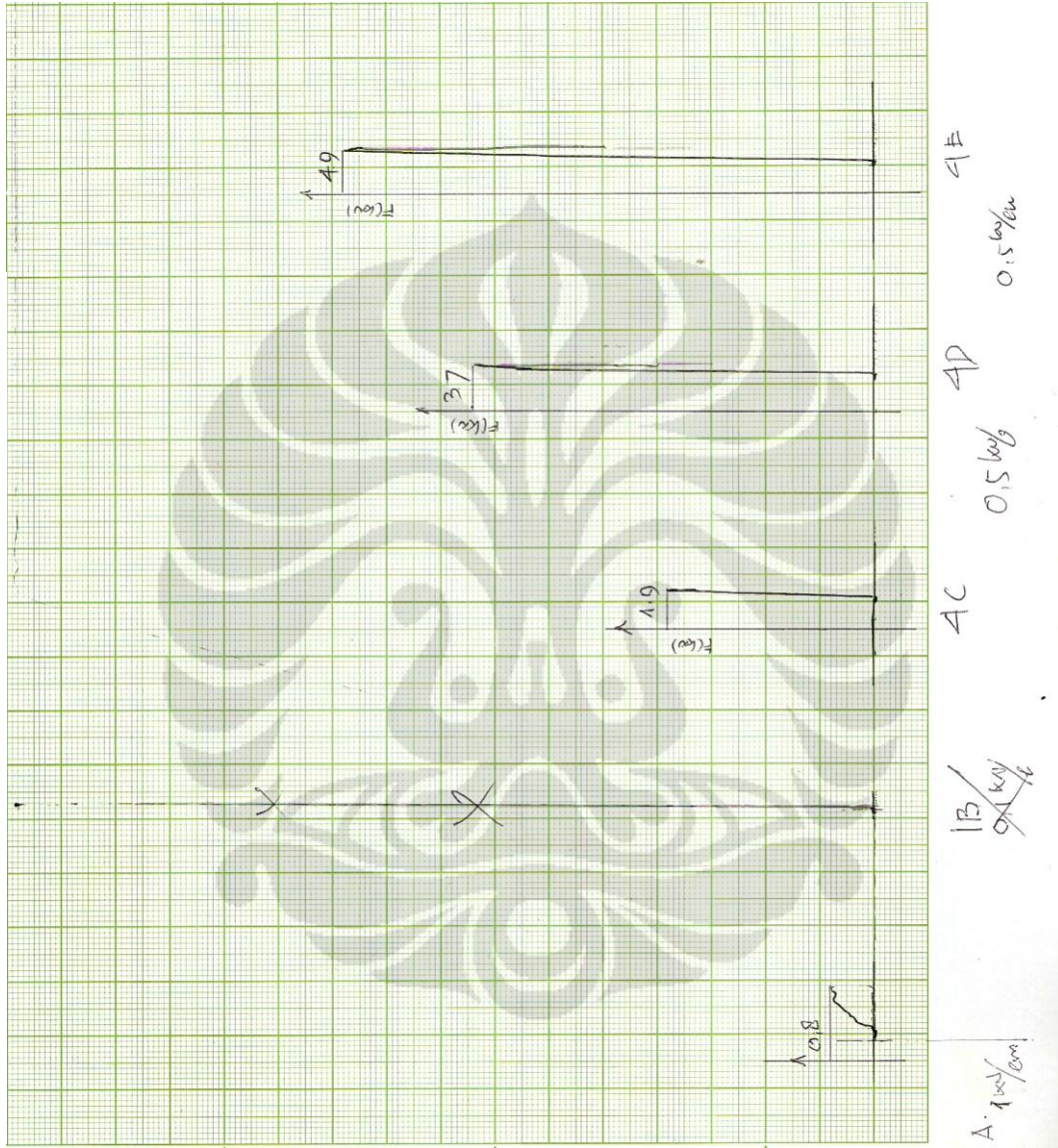
Lampiran 2
 Grafik Hasil Uji Tekan Sampel 1B, 2, 3A, 3B, 3C, dan 3C (TR)



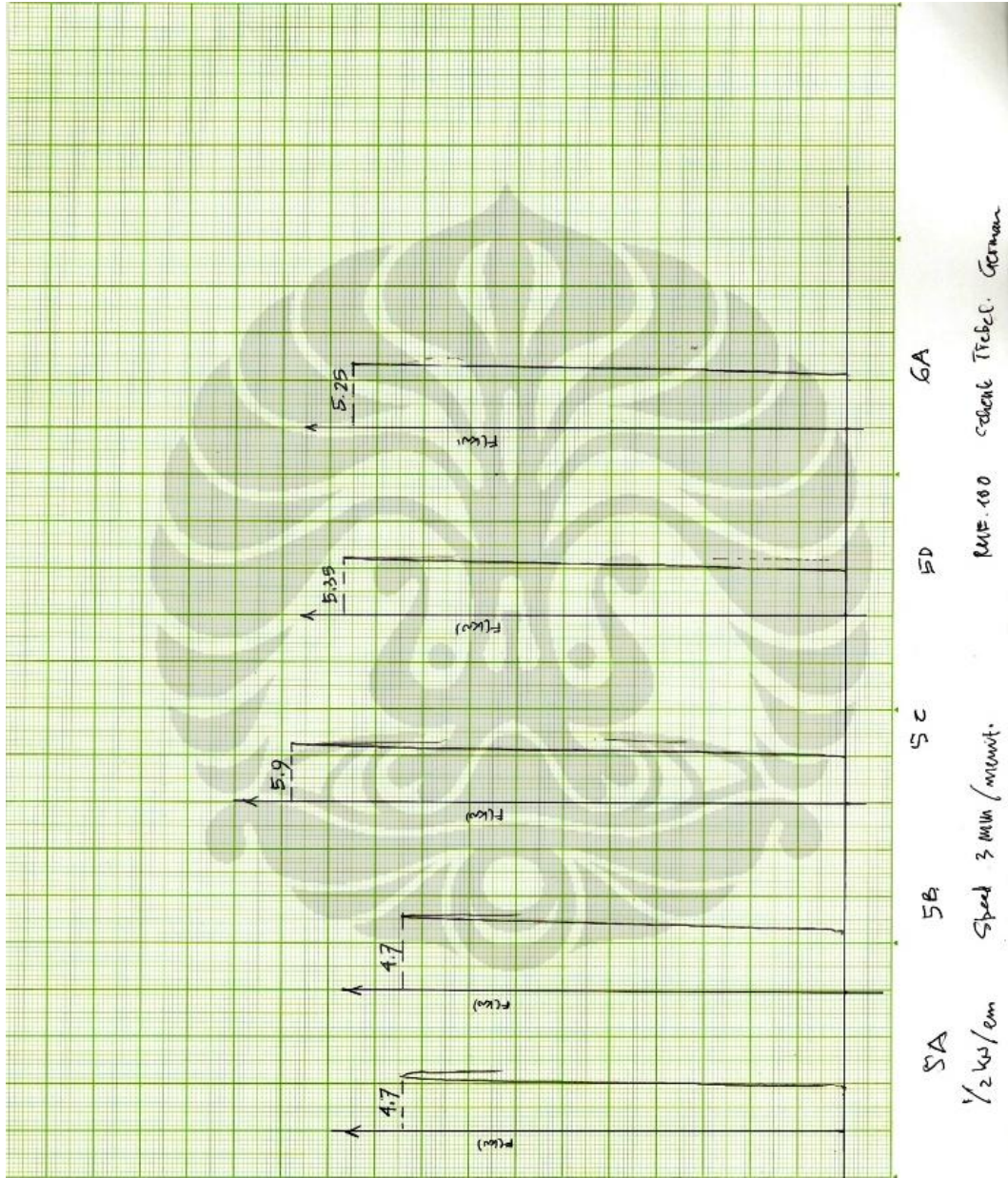
Lampiran 3
 Grafik Hasil Uji Tekan Sampel 3D, 3D (TR), 3E, 3F, 4A, dan 4B



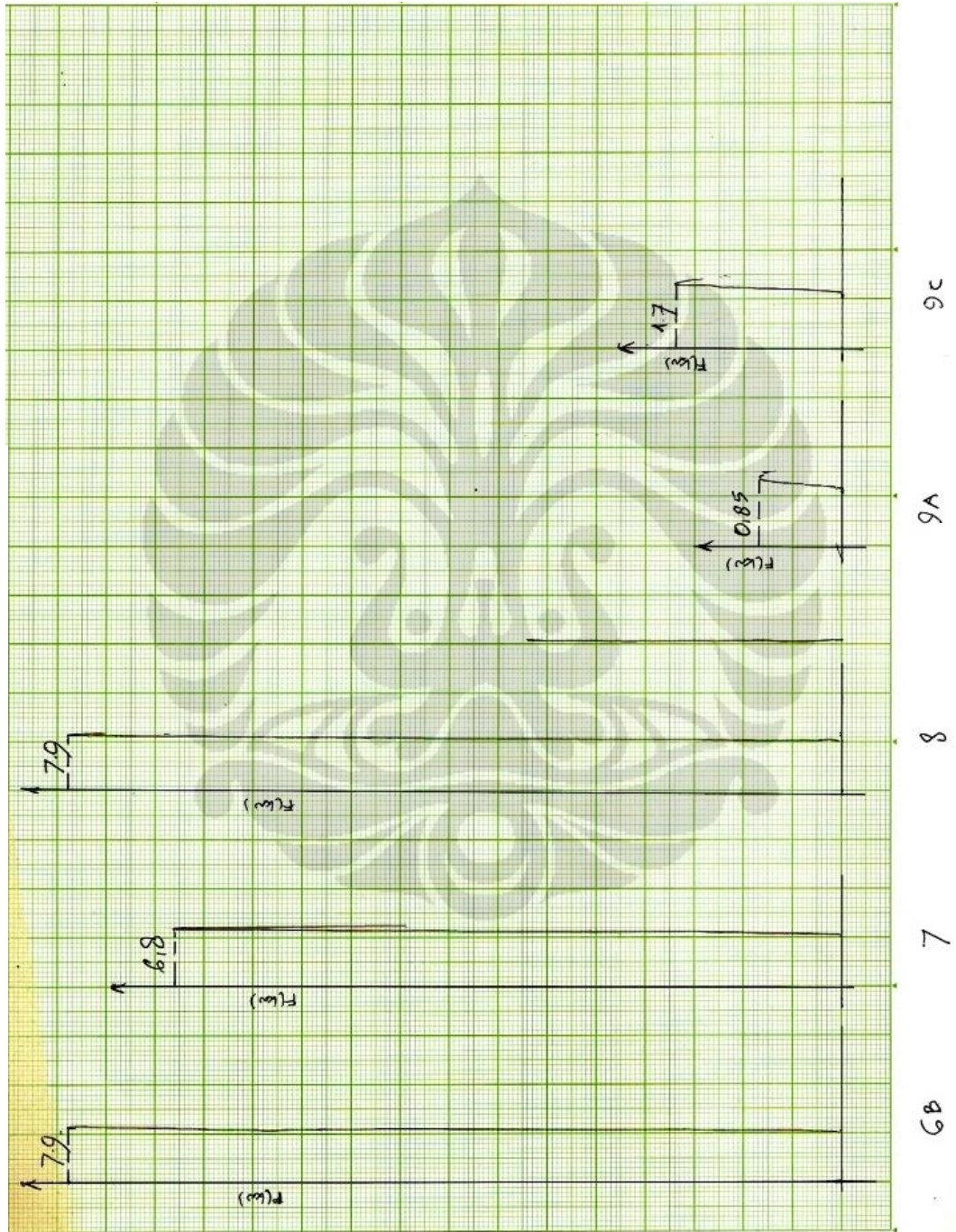
Lampiran 4
 Grafik Hasil Uji Tekan Sampel 1A, 4C, 4D, dan 4E



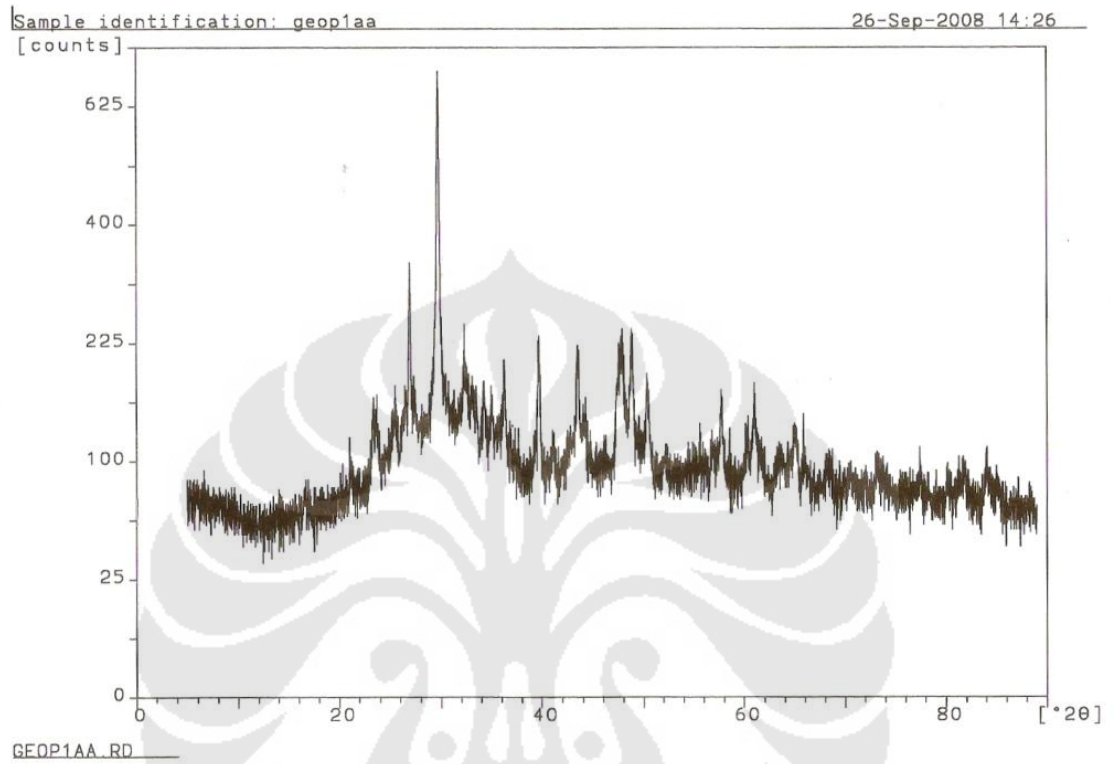
Lampiran 5
 Grafik Hasil Uji Tekan Sampel 5A, 5B, 5C, 5D, dan 6A



Lampiran 6
 Grafik Hasil Uji Tekan Sampel 6B, 7, 8, 9A, dan 9C



Lampiran 7
Hasil Pengujian XRD Sampel 1A



(lanjutan)

: GEOP1AA.DI 26-Sep-2008 14:21
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: geoplaa
 Data measured at: 26-Sep-2008 13:11:00

Diffraction type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

Start angle [°2θ]: 5.000
 End angle [°2θ]: 89.000
 Step size [°2θ]: 0.020
 Maximum intensity: 580.8100
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 35

Angle [°2θ]	d-value α1 [Å]	d-value α2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
16.645	5.3216	5.3349	0.240	14	104	2.5	0.81
21.170	4.1933	4.2037	0.160	38	92	6.6	1.59
23.350	3.8065	3.8159	0.120	94	86	16.2	1.04
23.740	3.7448	3.7541	0.240	76	85	13.0	0.77
25.530	3.4862	3.4948	0.200	83	83	14.3	1.04
26.940	3.3068	3.3150	0.080	250	79	43.0	1.35
29.735	3.0021	3.0095	0.160	581	76	100.0	4.84
31.305	2.8550	2.8621	0.120	76	74	13.0	0.87
32.315	2.7680	2.7749	0.400	106	72	18.3	1.97
33.100	2.7041	2.7109	0.160	77	72	13.3	1.16
34.230	2.6174	2.6239	0.160	74	69	12.7	0.90
35.090	2.5552	2.5616	0.320	52	69	8.9	0.77
36.275	2.4744	2.4806	0.160	90	69	15.5	1.42
39.710	2.2679	2.2736	0.200	106	66	18.3	2.95
41.155	2.1916	2.1970	0.320	16	64	2.8	0.82
43.425	2.0821	2.0873	0.200	76	62	13.0	2.01
44.115	2.0511	2.0562	0.240	29	62	5.0	1.27
47.830	1.9001	1.9049	0.240	88	58	15.2	2.22
48.800	1.8646	1.8692	0.280	72	56	12.4	4.10
50.315	1.8120	1.8165	0.280	50	53	8.7	3.16
52.120	1.7534	1.7577	0.480	8	50	1.3	1.21
56.805	1.6194	1.6234	0.240	10	49	1.8	1.18

(lanjutan)

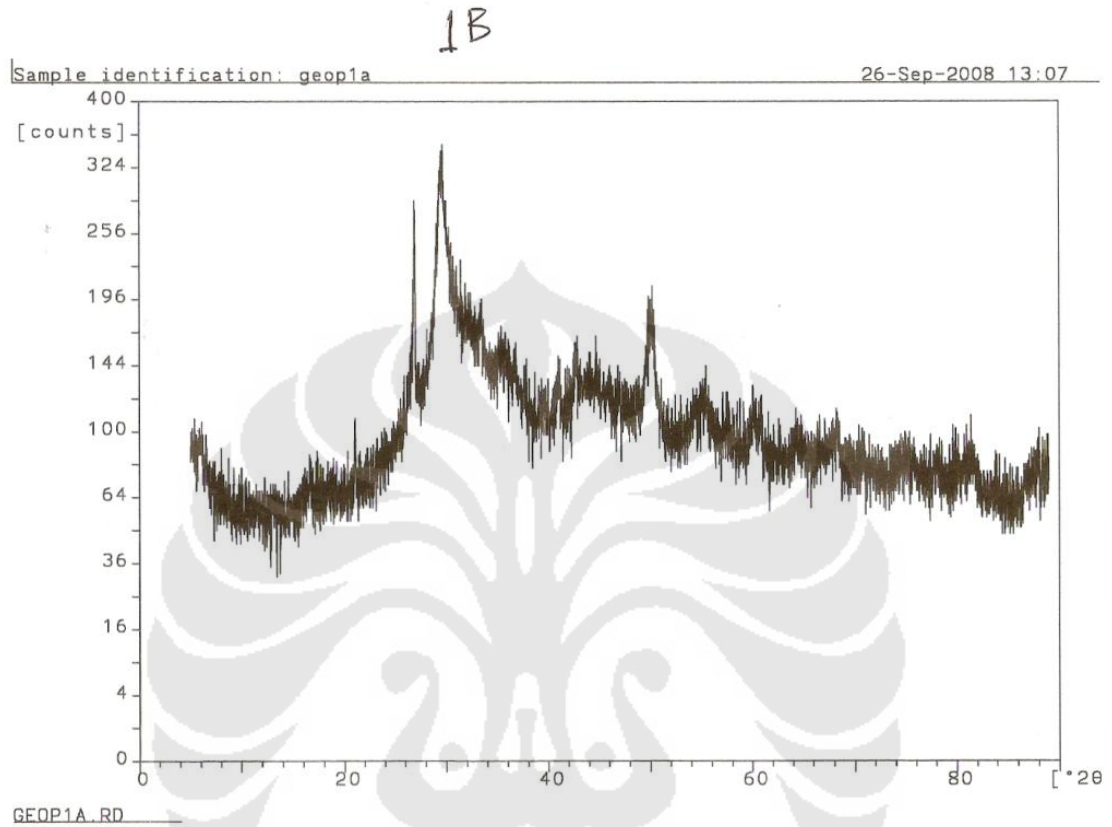
File: GEOP1AA.DI 26-Sep-2008 14:21

=====

Philips Analytical X-Ray B.V. Department of Metallurgy UI

Angle [°2θ]	d-value a1 [Å]	d-value a2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
57.700	1.5964	1.6003	0.160	40	46	6.8	1.03
60.235	1.5351	1.5389	0.240	16	41	2.8	1.06
60.965	1.5185	1.5222	0.120	40	40	6.8	1.10
63.530	1.4632	1.4668	0.640	13	37	2.2	1.02
64.970	1.4342	1.4378	0.400	24	36	4.1	1.93
65.825	1.4176	1.4212	0.240	12	35	2.1	0.94
68.305	1.3721	1.3755	0.640	10	34	1.7	1.46
69.920	1.3443	1.3476	0.280	7	32	1.3	1.25
73.200	1.2919	1.2951	0.320	10	31	1.7	0.81
77.450	1.2313	1.2344	0.240	8	28	1.4	1.20
80.115	1.1969	1.1999	0.120	11	27	1.9	0.75
81.790	1.1766	1.1795	0.240	10	26	1.8	0.80
83.970	1.1515	1.1544	0.320	10	26	1.8	0.77

Lampiran 8
Hasil Pengujian XRD Sampel 1B



(lanjutan)

: GEOP1A.DI 1B 26-Sep-2008 12:43
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: geop1a
 Data measured at: 26-Sep-2008 11:32:00

Diffractometer type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

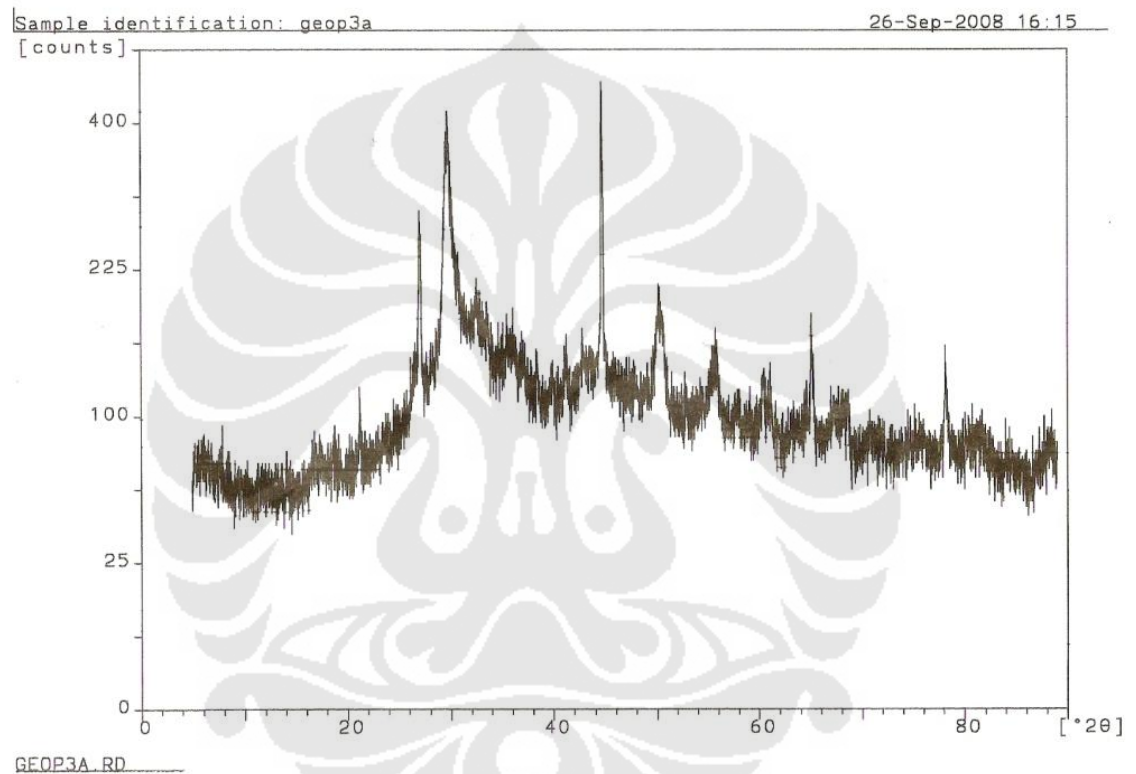
Start angle [°2θ]: 5.000
 End angle [°2θ]: 89.000
 Step size [°2θ]: 0.020
 Maximum intensity: 179.5600
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 13

Angle [°2θ]	d-value a1 [Å]	d-value a2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
21.040	4.2189	4.2294	0.120	37	94	20.7	1.31
26.850	3.3177	3.3260	0.080	180	128	100.0	1.93
29.355	3.0400	3.0476	0.560	156	161	87.0	5.06
33.415	2.6794	2.6860	0.480	14	137	8.0	1.13
35.445	2.5304	2.5367	0.800	15	110	8.5	1.18
41.060	2.1964	2.2019	0.280	12	81	6.4	1.02
42.690	2.1163	2.1215	0.320	14	85	8.0	0.88
50.255	1.8140	1.8185	0.720	37	62	20.7	4.86
55.255	1.6611	1.6652	0.480	12	53	6.8	1.23
57.090	1.6120	1.6160	0.200	6	49	3.5	0.76
60.150	1.5371	1.5409	0.560	12	45	6.4	1.41
68.265	1.3728	1.3762	0.640	7	37	4.1	1.27
81.580	1.1791	1.1820	0.640	6	28	3.2	0.76

Lampiran 9

Hasil Pengujian XRD Sampel 3A



(lanjutan)

: GEOP3A.DI 26-Sep-2008 15:53
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: geop3a
 Data measured at: 26-Sep-2008 14:43:00

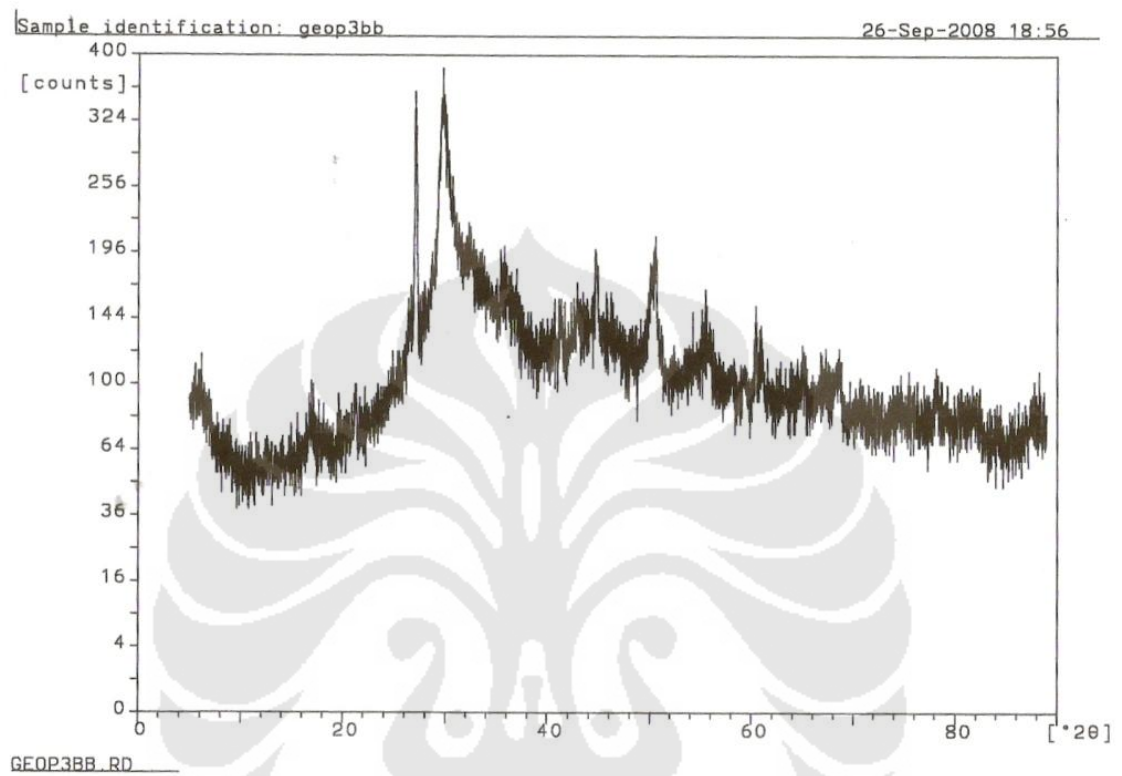
Diffractometer type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

Start angle [°2θ]: 5.000
 End angle [°2θ]: 89.000
 Step size [°2θ]: 0.020
 Maximum intensity: 259.2100
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 22

Angle [°2θ]	d-value a1 [Å]	d-value a2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
5.200	16.9804	17.0226	0.240	44	365	16.8	1.33
16.725	5.2964	5.3095	0.480	21	106	8.2	0.91
21.250	4.1777	4.1881	0.120	45	94	17.3	1.15
26.995	3.3002	3.3084	0.100	172	112	66.2	0.75
29.775	2.9981	3.0056	0.200	259	114	100.0	1.30
32.540	2.7494	2.7562	0.640	55	117	21.1	0.98
33.595	2.6654	2.6720	0.240	36	117	13.9	0.77
38.435	2.3402	2.3460	0.240	15	86	5.9	1.76
39.875	2.2589	2.2645	0.320	12	81	4.7	0.91
41.155	2.1916	2.1970	0.400	17	83	6.5	1.44
42.815	2.1104	2.1156	0.480	17	83	6.5	0.80
44.630	2.0287	2.0337	0.100	222	81	85.6	2.32
50.055	1.8208	1.8253	0.400	41	64	15.8	1.18
50.545	1.8043	1.8087	0.320	36	62	13.9	0.84
55.790	1.6464	1.6505	0.560	18	53	7.1	1.90
57.770	1.5946	1.5986	0.480	7	48	2.6	1.15
60.360	1.5322	1.5360	0.240	19	44	7.5	1.71
61.045	1.5167	1.5204	0.320	15	42	5.9	0.80
65.000	1.4336	1.4372	0.120	40	41	15.3	2.77
68.600	1.3669	1.3703	0.240	8	37	3.2	0.85
78.150	1.2220	1.2251	0.160	26	30	10.0	0.99
81.705	1.1776	1.1805	0.640	5	28	2.0	0.78

Lampiran 10
Hasil Pengujian XRD Sampel 3BB (3B bagian dalam)



(lanjutan)

: GEOP3BB.DI

26-Sep-2008 18:54

Philips Analytical X-Ray B.V.

Department of Metallurgy UI

Sample identification: geop3bb

Data measured at: 26-Sep-2008 17:43:00

Diffractometer type: PW1710 BASED

Tube anode: Cu

Generator tension [kV]: 40

Generator current [mA]: 30

Wavelength Alpha1 [Å]: 1.54056

Wavelength Alpha2 [Å]: 1.54439

Intensity ratio (alpha2/alpha1): 0.500

Divergence slit: AUTOMATIC

Irradiated length [mm]: 12

Receiving slit: 0.2

Monochromator used: YES

Start angle [$^{\circ}2\theta$]: 5.000End angle [$^{\circ}2\theta$]: 89.000Step size [$^{\circ}2\theta$]: 0.020

Maximum intensity: 246.4900

Time per step [s]: 1.000

Type of scan: CONTINUOUS

Intensities converted to: FIXED

Minimum peak tip width: 0.00

Maximum peak tip width: 1.00

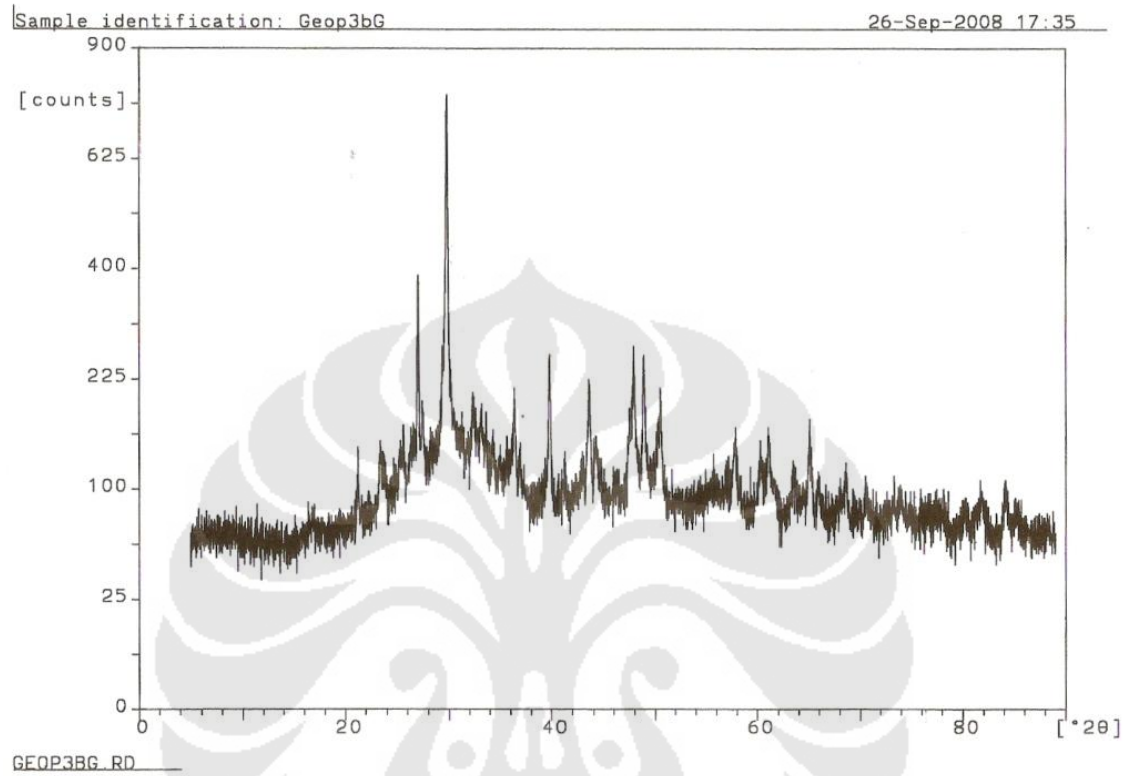
Peak base width: 2.00

Minimum significance: 0.75

Number of peaks: 16

Angle [$^{\circ}2\theta$]	d-value a1 [Å]	d-value a2 [Å]	Peak width [$^{\circ}2\theta$]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
16.940	5.2296	5.2426	0.480	26	106	10.6	1.45
20.420	4.3456	4.3564	0.100	25	96	10.1	0.84
21.305	4.1670	4.1774	0.160	31	96	12.7	0.89
26.995	3.3002	3.3084	0.100	246	137	100.0	1.59
29.675	3.0080	3.0155	0.640	161	180	65.4	7.46
35.775	2.5078	2.5141	0.800	16	119	6.5	1.14
41.215	2.1885	2.1940	0.240	12	88	5.0	1.04
42.875	2.1076	2.1128	0.320	19	86	7.9	0.75
44.615	2.0293	2.0344	0.120	41	86	16.6	0.85
50.540	1.8044	1.8089	0.200	46	66	18.8	1.19
55.680	1.6494	1.6535	0.960	10	56	4.2	2.65
60.305	1.5335	1.5373	0.240	15	48	6.2	1.18
65.060	1.4324	1.4360	0.400	8	41	3.2	1.10
68.465	1.3693	1.3727	0.480	8	40	3.4	0.76
78.145	1.2221	1.2251	0.320	6	31	2.5	0.89
82.025	1.1738	1.1767	0.960	3	28	1.2	0.87

Lampiran 11
Hasil Pengujian XRD Sampel 3BG (3B bagian luar)



(lanjutan)

: GEOP3BG.DI 26-Sep-2008 17:28
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: Geop3bG
 Data measured at: 26-Sep-2008 16:18:00

Diffractometer type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

Start angle [$^{\circ}2\theta$]: 5.000
 End angle [$^{\circ}2\theta$]: 89.000
 Step size [$^{\circ}2\theta$]: 0.020
 Maximum intensity: 681.2100
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 37

Angle [$^{\circ}2\theta$]	d-value $\alpha 1$ [Å]	d-value $\alpha 2$ [Å]	Peak width [$^{\circ}2\theta$]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
5.340	16.5355	16.5766	0.480	9	320	1.3	1.10
16.710	5.3011	5.3143	0.480	18	106	2.7	1.26
21.230	4.1816	4.1920	0.060	102	92	15.0	1.08
23.415	3.7961	3.8055	0.200	90	85	13.2	1.60
25.215	3.5290	3.5378	0.200	67	81	9.9	0.85
27.010	3.2984	3.3066	0.100	342	76	50.2	2.54
27.445	3.2471	3.2552	0.160	112	76	16.5	1.02
29.755	3.0001	3.0075	0.140	681	71	100.0	5.86
32.325	2.7672	2.7741	0.400	104	67	15.3	1.94
33.095	2.7045	2.7113	0.200	83	67	12.2	1.09
33.600	2.6650	2.6717	0.120	83	66	12.2	0.99
34.250	2.6159	2.6224	0.240	55	64	8.0	1.38
34.940	2.5658	2.5722	0.240	48	64	7.0	0.90
36.330	2.4708	2.4769	0.200	88	62	13.0	1.47
36.905	2.4336	2.4397	0.160	38	61	5.6	0.89
39.780	2.2641	2.2697	0.200	119	59	17.4	3.83
41.200	2.1893	2.1947	0.240	25	58	3.7	1.70
43.535	2.0771	2.0823	0.240	88	56	13.0	3.02
44.175	2.0485	2.0536	0.240	40	55	5.8	2.20
46.110	1.9669	1.9718	0.400	12	55	1.8	0.89
47.405	1.9162	1.9209	0.160	45	53	6.6	0.78
47.870	1.8986	1.9034	0.160	90	52	13.2	1.20

(lanjutan)

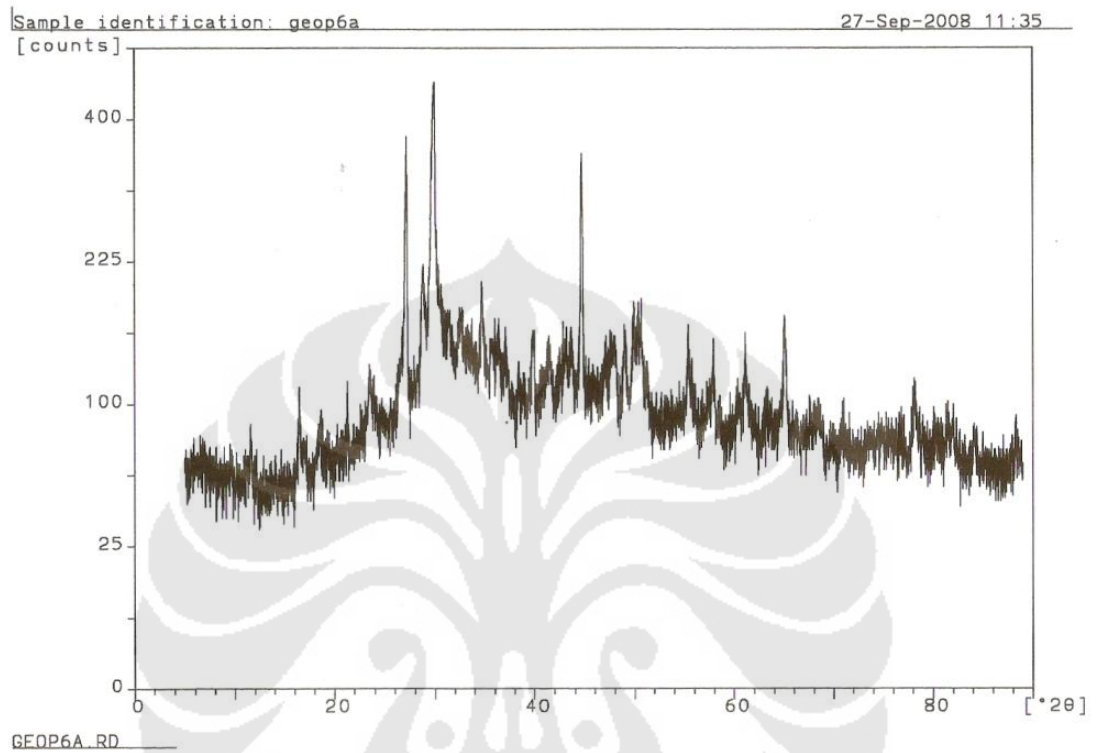
File: GEOP3BG.DI 26-Sep-2008 17:28

=====

Philips Analytical X-Ray B.V. Department of Metallurgy UI

Angle [$^{\circ}2\theta$]	d-value a_1 [Å]	d-value a_2 [Å]	Peak width [$^{\circ}2\theta$]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
48.840	1.8632	1.8678	0.160	98	53	14.4	1.78
50.480	1.8064	1.8109	0.100	66	50	9.6	1.00
57.815	1.5935	1.5974	0.160	34	45	4.9	0.82
60.255	1.5347	1.5385	0.240	25	40	3.7	2.12
61.005	1.5176	1.5213	0.160	38	40	5.6	1.00
63.470	1.4644	1.4681	0.320	14	36	2.0	0.87
64.985	1.4339	1.4375	0.160	32	36	4.8	1.12
65.865	1.4169	1.4204	0.240	14	35	2.0	1.16
68.600	1.3669	1.3703	0.160	14	32	2.0	0.76
70.485	1.3349	1.3382	0.320	7	32	1.1	0.83
77.935	1.2248	1.2279	0.960	4	28	0.5	0.98
80.205	1.1958	1.1988	0.480	8	25	1.2	1.48
81.845	1.1759	1.1789	0.960	11	24	1.6	3.39
84.150	1.1495	1.1524	0.480	12	23	1.7	2.34
85.155	1.1385	1.1413	0.320	7	24	1.0	1.37

Lampiran 12
Hasil Pengujian XRD Sampel 6A



(lanjutan)

: GEOP6A.DI 27-Sep-2008 11:31
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: geop6a
 Data measured at: 27-Sep-2008 10:21:00

Diffraction type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

Start angle [°2θ]: 5.000
 End angle [°2θ]: 89.000
 Step size [°2θ]: 0.020
 Maximum intensity: 353.4400
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 37

Angle [°2θ]	d-value a1 [Å]	d-value a2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
11.600	7.6223	7.6412	0.120	67	121	19.0	0.93
16.500	5.3681	5.3814	0.120	88	94	25.0	1.49
18.560	4.7767	4.7885	0.320	29	92	8.3	1.01
21.355	4.1574	4.1677	0.120	40	94	11.2	1.18
23.555	3.7738	3.7832	0.240	52	98	14.7	1.85
27.200	3.2758	3.2840	0.120	250	94	70.6	3.24
28.850	3.0921	3.0998	0.280	130	88	36.8	3.24
29.950	2.9810	2.9884	0.140	353	86	100.0	1.54
32.545	2.7490	2.7558	0.400	64	79	18.1	1.18
34.700	2.5830	2.5895	0.160	86	74	24.5	0.95
35.680	2.5143	2.5205	0.240	48	72	13.5	0.96
36.450	2.4629	2.4691	0.240	49	71	13.9	0.76
37.095	2.4216	2.4276	0.400	38	71	10.9	1.60
38.370	2.3440	2.3498	0.240	23	67	6.5	0.95
39.965	2.2540	2.2596	0.280	41	66	11.6	2.73
41.410	2.1787	2.1841	0.480	31	62	8.9	1.86
43.030	2.1003	2.1055	0.240	36	61	10.2	1.10
43.630	2.0728	2.0780	0.280	40	59	11.2	1.57
44.635	2.0284	2.0335	0.140	166	59	47.1	3.72
47.020	1.9310	1.9358	0.240	28	56	7.9	1.00
47.960	1.8953	1.9000	0.240	36	55	10.2	1.02
49.000	1.8575	1.8621	0.240	35	53	9.8	0.75

(lanjutan)

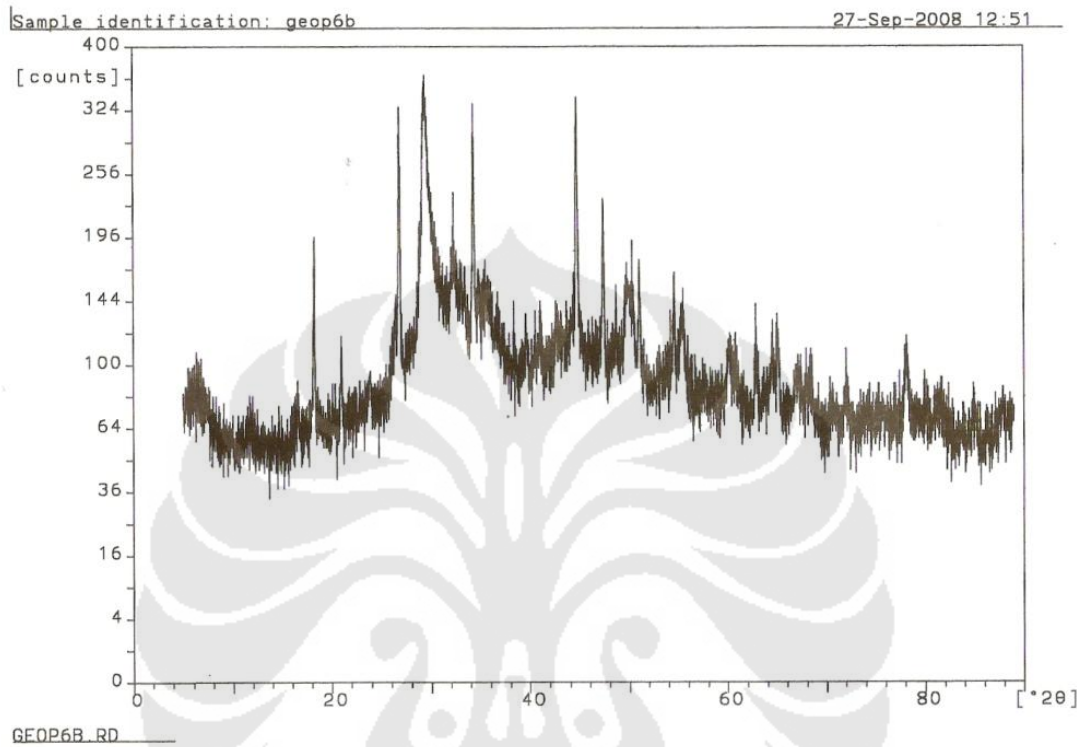
File: GEOP6A.DI 27-Sep-2008 11:31

=====

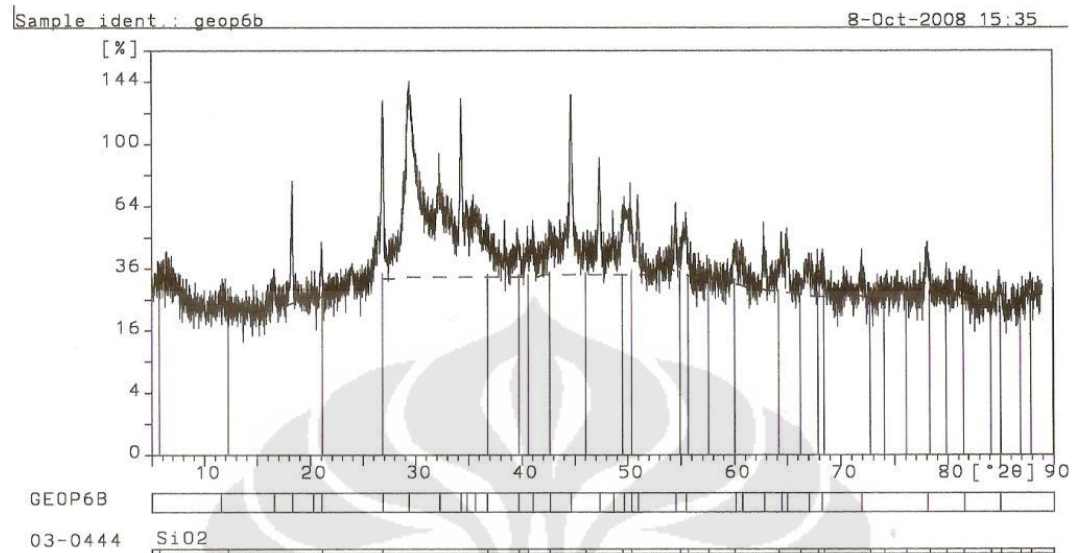
Philips Analytical X-Ray B.V. Department of Metallurgy UI

Angle [°2 θ]	d-value a_1 [Å]	d-value a_2 [Å]	Peak width [°2 θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
49.850	1.8278	1.8323	0.200	41	53	11.6	1.26
50.330	1.8115	1.8160	0.320	46	52	13.1	0.75
55.335	1.6589	1.6630	0.120	32	46	9.2	1.39
57.880	1.5918	1.5958	0.240	20	41	5.7	1.67
60.355	1.5323	1.5362	0.240	15	38	4.3	0.90
61.075	1.5160	1.5198	0.320	28	37	7.9	1.25
63.225	1.4695	1.4732	0.480	12	35	3.3	2.24
64.990	1.4338	1.4374	0.160	42	34	12.0	0.97
66.255	1.4095	1.4130	0.560	4	32	1.2	0.94
68.550	1.3678	1.3712	0.480	8	30	2.4	1.98
78.155	1.2219	1.2250	0.200	15	27	4.3	1.02
80.210	1.1957	1.1987	0.480	6	25	1.6	0.95
81.660	1.1781	1.1811	0.640	6	24	1.8	0.85
84.115	1.1499	1.1527	0.400	7	23	2.1	1.60
88.330	1.1056	1.1083	0.240	8	19	2.2	0.82

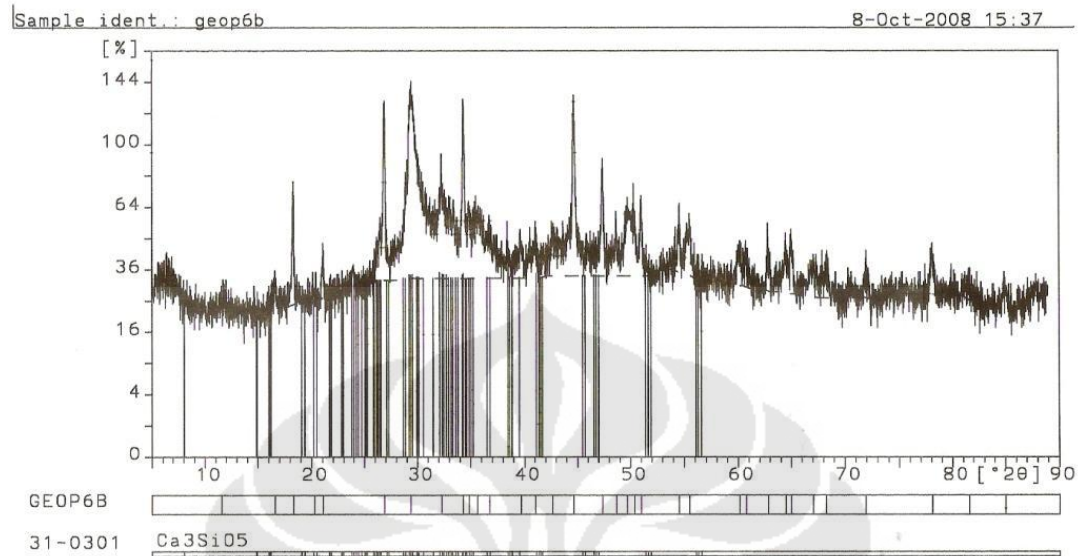
Lampiran 13
Hasil Pengujian XRD Sampel 6B



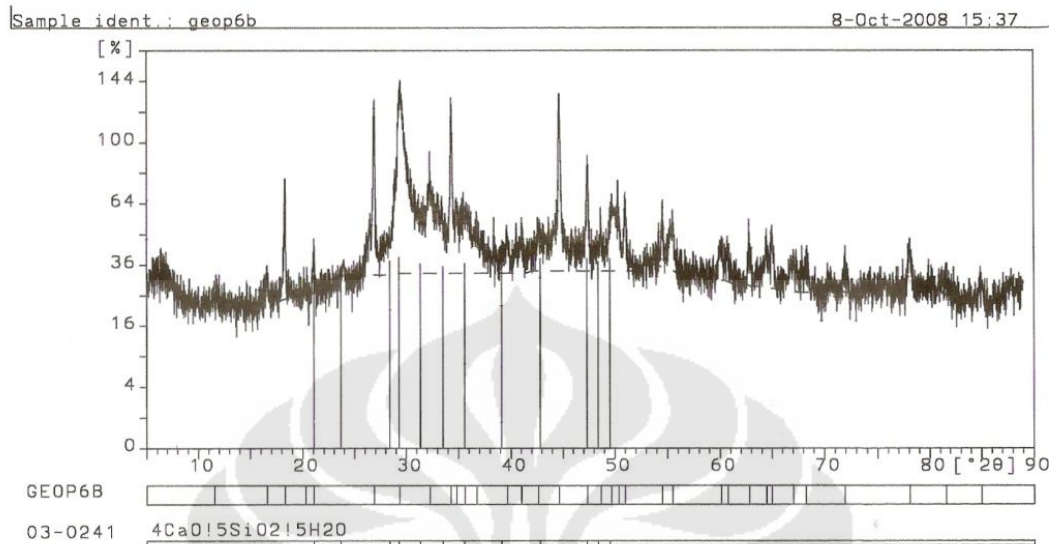
(lanjutan)



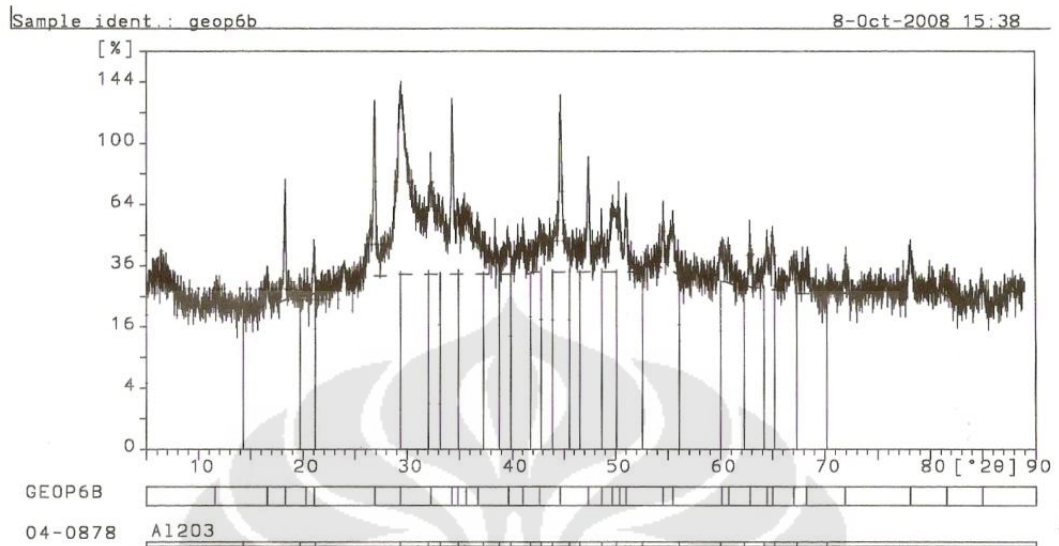
(lanjutan)



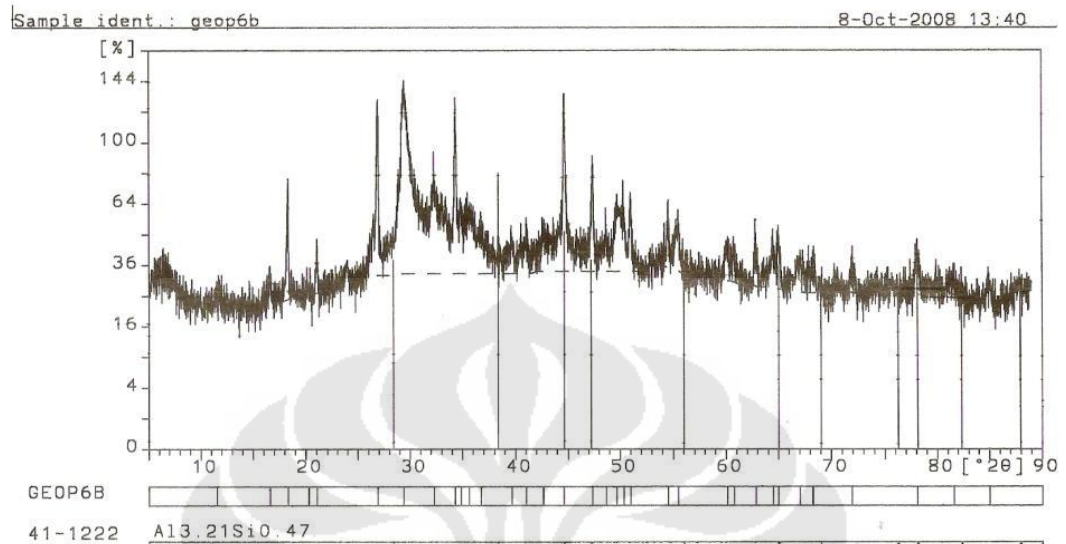
(lanjutan)



(lanjutan)



(lanjutan)



(lanjutan)

: GEOP6B.DI 27-Sep-2008 12:49
 =====
 Philips Analytical X-Ray B.V. Department of Metallurgy UI

Sample identification: geop6b
 Data measured at: 27-Sep-2008 11:38:00

Diffractometer type: PW1710 BASED
 Tube anode: Cu
 Generator tension [kV]: 40
 Generator current [mA]: 30
 Wavelength Alpha1 [Å]: 1.54056
 Wavelength Alpha2 [Å]: 1.54439
 Intensity ratio (alpha2/alpha1): 0.500
 Divergence slit: AUTOMATIC
 Irradiated length [mm]: 12
 Receiving slit: 0.2
 Monochromator used: YES

Start angle [°2θ]: 5.000
 End angle [°2θ]: 89.000
 Step size [°2θ]: 0.020
 Maximum intensity: 252.8100
 Time per step [s]: 1.000
 Type of scan: CONTINUOUS
 Intensities converted to: FIXED

Minimum peak tip width: 0.00
 Maximum peak tip width: 1.00
 Peak base width: 2.00
 Minimum significance: 0.75
 Number of peaks: 34

Angle [°2θ]	d-value α1 [Å]	d-value α2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
11.560	7.6486	7.6676	0.960	16	137	6.3	0.89
16.605	5.3344	5.3476	0.120	55	98	21.7	1.01
18.325	4.8374	4.8494	0.080	219	94	86.6	1.32
20.285	4.3742	4.3851	0.480	5	92	1.9	0.95
21.060	4.2149	4.2254	0.160	64	90	25.3	1.01
26.860	3.3165	3.3247	0.160	253	88	100.0	6.57
29.335	3.0421	3.0496	0.240	253	83	100.0	1.97
32.255	2.7730	2.7799	0.400	98	76	38.8	2.00
34.290	2.6130	2.6195	0.140	213	71	84.3	4.21
34.840	2.5730	2.5794	0.160	62	69	24.7	1.00
35.625	2.5181	2.5243	0.640	53	69	21.1	1.05
36.755	2.4432	2.4493	0.240	37	66	14.7	0.85
39.660	2.2707	2.2763	0.240	26	61	10.3	0.96
41.055	2.1967	2.2021	0.240	31	59	12.4	1.95
42.680	2.1167	2.1220	0.480	28	59	11.1	0.90
44.640	2.0282	2.0333	0.100	166	56	65.8	2.03
47.335	1.9189	1.9236	0.160	86	53	34.2	2.14
48.685	1.8688	1.8734	0.240	27	52	10.7	1.08
49.665	1.8341	1.8387	0.320	40	50	15.7	1.33
50.345	1.8110	1.8155	0.200	34	50	13.3	0.83
51.010	1.7889	1.7933	0.160	45	49	17.8	1.15
54.540	1.6812	1.6853	0.160	37	49	14.7	1.20

(lanjutan)

File: GEOP6B.DI 27-Sep-2008 12:49

=====

Philips Analytical X-Ray B.V. Department of Metallurgy UI

Angle [°2θ]	d-value a1 [Å]	d-value a2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
55.435	1.6561	1.6602	0.400	25	46	9.9	1.60
60.115	1.5379	1.5417	0.320	16	38	6.3	0.90
60.785	1.5225	1.5263	0.320	16	37	6.3	0.99
62.805	1.4783	1.4820	0.080	26	34	10.3	0.75
64.460	1.4443	1.4479	0.120	27	32	10.7	1.03
64.970	1.4342	1.4378	0.160	24	32	9.5	0.85
67.030	1.3950	1.3985	0.480	10	30	3.8	1.18
68.225	1.3735	1.3769	0.480	9	29	3.6	1.32
71.920	1.3117	1.3150	0.400	8	28	3.3	1.74
78.105	1.2226	1.2256	0.240	18	27	7.3	1.08
81.570	1.1792	1.1821	0.960	4	25	1.6	0.79
84.995	1.1402	1.1430	0.480	6	21	2.3	2.33

(lanjutan)

File: GEOP6B.DI

8-Oct-2008 14:52

Philips Analytical X-Ray B.V.

Department of Metallurgy UI

Sample identification: geop6b
Data measured at: 27-Sep-2008 11:38:00

Diffractometer type: PW1710 BASED
Tube anode: Cu
Generator tension [kV]: 40
Generator current [mA]: 30
Wavelength Alpha1 [Å]: 1.54056
Wavelength Alpha2 [Å]: 1.54439
Intensity ratio (alpha2/alpha1): 0.500
Divergence slit: AUTOMATIC
Irradiated length [mm]: 12
Receiving slit: 0.2
Monochromator used: YES

Start angle [°2θ]: 5.000
End angle [°2θ]: 89.000
Step size [°2θ]: 0.020
Maximum intensity: 252.8100
Time per step [s]: 1.000
Type of scan: CONTINUOUS

Intensities converted to: FIXED

Minimum peak tip width: 0.00
Maximum peak tip width: 1.00
Peak base width: 2.00
Minimum significance: 0.75
Number of peaks: 34

Angle [°2θ]	d-value α1 [Å]	d-value α2 [Å]	Peak width [°2θ]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
11.560	7.6486	7.6676	0.960	16	137	6.3	0.89
16.605	5.3344	5.3476	0.120	55	98	21.7	1.01
18.325	4.8374	4.8494	0.080	219	94	86.6	1.32
20.285	4.3742	4.3851	0.480	5	92	1.9	0.95
21.060	4.2149	4.2254	0.160	64	90	25.3	1.01
26.860	3.3165	3.3247	0.160	253	88	100.0	6.57
29.335	3.0421	3.0496	0.240	253	83	100.0	1.97
32.255	2.7730	2.7799	0.400	98	76	38.8	2.00
34.290	2.6130	2.6195	0.140	213	71	84.3	4.21
34.840	2.5730	2.5794	0.160	62	69	24.7	1.00
35.625	2.5181	2.5243	0.640	53	69	21.1	1.05
36.755	2.4432	2.4493	0.240	37	66	14.7	0.85
39.660	2.2707	2.2763	0.240	26	61	10.3	0.96
41.055	2.1967	2.2021	0.240	31	59	12.4	1.95
42.680	2.1167	2.1220	0.480	28	59	11.1	0.90
44.640	2.0282	2.0333	0.100	166	56	65.8	2.03
47.335	1.9189	1.9236	0.160	86	53	34.2	2.14
48.685	1.8688	1.8734	0.240	27	52	10.7	1.08
49.665	1.8341	1.8387	0.320	40	50	15.7	1.33
50.345	1.8110	1.8155	0.200	34	50	13.3	0.83
51.010	1.7889	1.7933	0.160	45	49	17.8	1.15
54.540	1.6812	1.6853	0.160	37	49	14.7	1.20

(lanjutan)

File: GEOP6B.DI 8-Oct-2008 14:52

=====

Philips Analytical X-Ray B.V. Department of Metallurgy UI

Angle [$^{\circ}2\theta$]	d-value a_1 [Å]	d-value a_2 [Å]	Peak width [$^{\circ}2\theta$]	Peak int [counts]	Back. int [counts]	Rel. int [%]	Signif.
55.435	1.6561	1.6602	0.400	25	46	9.9	1.60
60.115	1.5379	1.5417	0.320	16	38	6.3	0.90
60.785	1.5225	1.5263	0.320	16	37	6.3	0.99
62.805	1.4783	1.4820	0.080	26	34	10.3	0.75
64.460	1.4443	1.4479	0.120	27	32	10.7	1.03
64.970	1.4342	1.4378	0.160	24	32	9.5	0.85
67.030	1.3950	1.3985	0.480	10	30	3.8	1.18
68.225	1.3735	1.3769	0.480	9	29	3.6	1.32
71.920	1.3117	1.3150	0.400	8	28	3.3	1.74
78.105	1.2226	1.2256	0.240	18	27	7.3	1.08
81.570	1.1792	1.1821	0.960	4	25	1.6	0.79
84.995	1.1402	1.1430	0.480	6	21	2.3	2.33

Lampiran 14
Database Pengujian XRD Untuk SiO₂

83-2473		Wavelength= 1.54060					C				
SiO2	2θ	Int	h	k	l	2θ	Int	h	k	l	
Silicon Oxide	2 21.351	471	1	0	0	82.955	1	1	1	4	
	1 27.202	999*	1	0	1	83.811	1	3	1	0	
	3 37.429	22	1	1	0	86.225	1	3	1	1	
Quartz - synthetic	40.226	14	0	1	2	86.904	1	0	2	4	
Rad.: CuKα1 λ: 1.54060 Filter: d-sp: Calculated	41.224	6	1	1	1	89.509	1	2	2	2	
	43.491	6	2	0	0	89.735	1	0	3	3	
Cut off: 17.7 Int.: Calculated 1/ICor.: 0.54	46.881	1	0	2	1						
Ref: Calculated from ICSD using POWD-12++, (1997)	51.226	2	1	1	2						
Ref: Jorgensen, J.D., J. Appl. Phys., 49, 5473 (1978)	51.515	1	0	0	3						
	56.109	1	2	0	2						
	56.381	1	1	0	3						
Sys.: Hexagonal S.G.: P3 ₁ 21 (152)	58.696	1	2	1	0						
a: 4.8016(5) b: c: 5.3177(9) A: C: 1.1075	61.470	1	2	1	1						
α: β: γ: Z: 3 mp:	65.392	1	1	1	3						
Ref: Ibid.	67.522	1	3	0	0						
	69.407	1	2	1	2						
	69.649	1	0	2	3						
	70.101	1	3	0	1						
Dx: 2.819 Dm: ICSD #: 200729	74.935	1	0	1	4						
	77.616	1	0	3	2						
	79.838	1	2	2	0						
Peak height intensity. R-factor: 0.032. PSC: hP9. Mwt: 60.08. Volume[CD]: 106.18.	81.843	1	1	2	3						
	82.272	1	2	2	1						



© 1998 JCPDS-International Centre for Diffraction Data. All rights reserved
PCPDFWIN v. 2.01

Lampiran 15
Database Pengujian XRD Untuk CaCO₃

83-0578		Wavelength= 1.54060					C				
Ca(CO ₃)		2θ	Int	h	k	l	2θ	Int	h	k	l
Calcium Carbonate		→ 23.060	99	0	1	2	77.196	19	1	1	12
		29.410	999*	1	0	4	78.444	1	2	2	3
		31.451	19	0	0	6	80.248	1	1	3	1
Calcite		35.976	139	1	1	0	80.958	5	3	1	2
Rad.: CuKα1 λ: 1.54060 Filter:	d-sp: Calculated	39.418	175	1	1	3	81.555	21	2	1	10
Cut off: 17.7 Int.: Calculated	I/lor.: 3.21	43.167	149	2	0	2	82.151	3	0	1	14
Ref: Calculated from ICSD using POWD-12+., (1997)		47.126	64	0	2	4	83.790	39	1	3	4
Ref: Warchow, R., Z. Kristallogr., 186, 300 (1989)		3 47.527	185	0	1	8	84.828	17	2	2	6
		λ 48.520	194	1	1	6	85.902	1	3	1	5
		56.574	30	2	1	1	86.494	4	1	2	11
		57.410	87	1	2	2					
Sys.: Rhombohedral	S.G.: R3c (167)	58.107	11	1	0	10					
a: 4.9887(1) b:	c: 17.0529(8) A:	60.682	51	2	1	4					
α:	β:	γ:	Z: 6	mp:	61.020	23	2	0	8		
Ref: Ibid.		61.398	24	1	1	9					
		63.068	19	1	2	5					
		64.673	57	3	0	0					
		65.647	31	0	0	12					
Dx: 2.713 Dm:	ICSD #: 079674	69.207	10	2	1	7					
		70.269	18	0	2	10					
Peak height intensity. R-factor: 0.018. PSC: hR10. Mwt:		72.916	26	1	2	8					
100.09. Volume[CD]: 367.54.		73.687	6	3	0	6					
		76.287	11	2	2	0					

ICSD . 1996 JCPDS-International Centre for Diffraction Data. All rights reserved
PCPDFWIN v. 2.01

Lampiran 16
Database Pengujian XRD Untuk Ca₂(SiO₄)(H₂O)

81-1987		Wavelength= 1.54060										C
Ca ₂ (SiO ₄)(H ₂ O)		2θ	Int	h	k	l	2θ	Int	h	k	l	
Calcium Silicate Hydrate ✓		12.477	1	1	0	1	32.902	79	3	0	2	
		12.713	2	0	1	1	32.902	79	2	1	3	
		13.411	1	1	1	0	33.218	113	1	2	3	
		15.783	10	1	1	1	33.582	166	0	0	4	
		16.610	121	0	0	2	34.359	241	3	1	2	
		18.691	2	2	0	0	34.359	241	3	2	0	
		19.076	21	1	0	2	34.866	146	2	3	0	
		19.324	17	0	2	0	34.866	146	1	0	4	
		21.065	440	0	2	1	35.456	172	3	2	1	
		21.065	440	2	1	0	35.898	41	2	3	1	
		21.408	40	1	1	2	36.310	51	1	1	4	
		22.670	183	2	1	1	37.152	384	2	2	3	
		23.068	41	1	2	1	37.905	3	4	0	0	
		25.105	215	2	0	2	38.052	2	3	0	3	
		25.587	25	0	2	2	38.440	34	3	2	2	
		26.944	145	2	1	2	38.707	22	2	0	4	
		27.011	167	2	2	0	38.852	58	2	3	2	
		27.284	999*	1	2	2	38.852	58	4	0	1	
		28.299	7	2	2	1	39.036	67	0	2	4	
		28.496	26	1	1	3	39.343	21	3	1	3	
		29.437	1	3	0	1	39.989	14	2	1	4	
		29.860	3	3	1	0	39.989	14	1	3	3	
		31.039	254	3	1	1	40.136	66	4	1	1	
		31.830	233	1	3	1	40.136	66	0	4	1	
		31.830	233	2	2	2	40.220	56	1	2	4	

Rad.: CuKα1 λ: 1.54060 Filter: d-sp: Calculated
 CuI off: 17.7 Int.: Calculated I/lor.: 1.29
 Ref: Calculated from ICSD using POWD-12++. (1997)
 Ref: Yano, T et al., Acta Crystallogr., Sec. C., 49, 1555 (1993)

Sys.: Orthorhombic S.G.: P2₁2₁2₁ (19)
 a: 9.487(4) b: 9.179(4) c: 10.666(7) A: 1.0336 C: 1.1620
 α: β: γ: Z: 8 mp:
 Ref: Ibid.

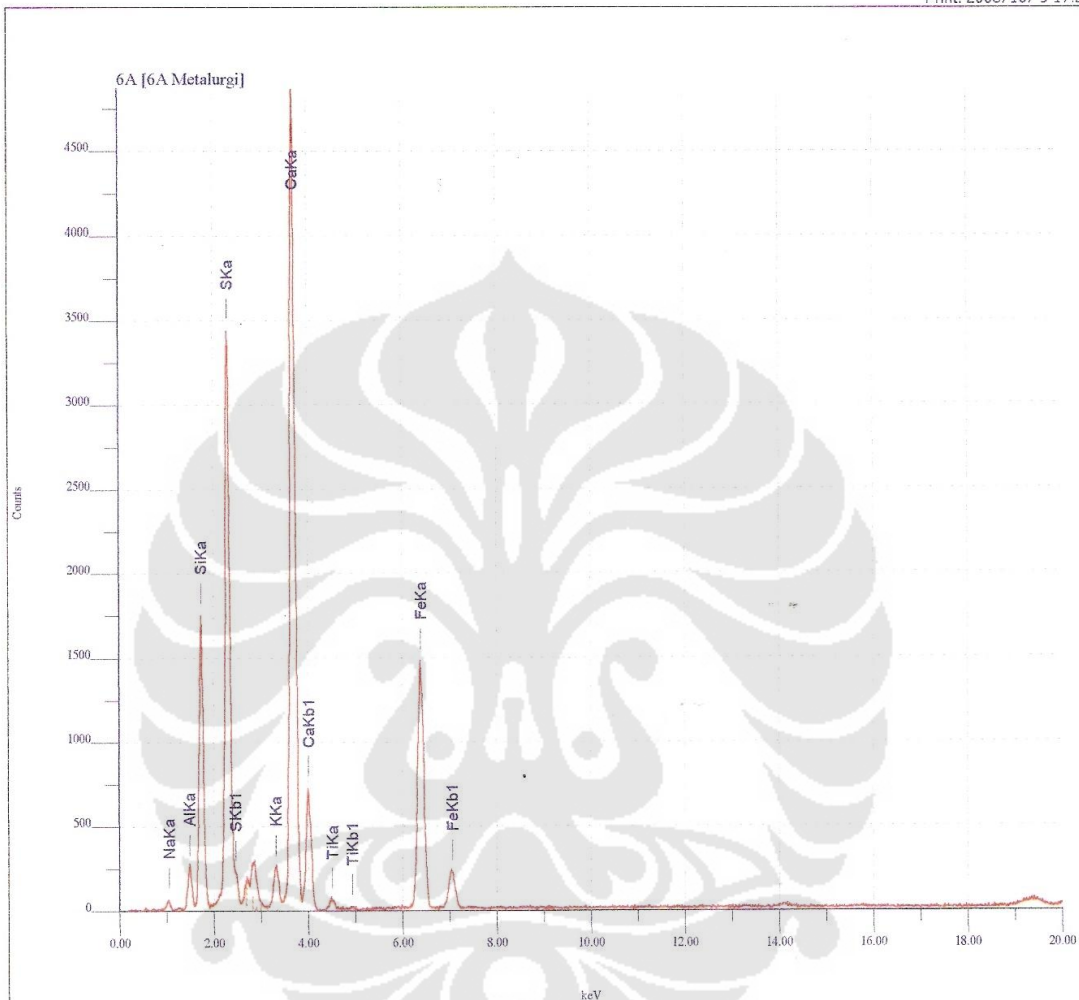
Dx: 2.721 Dm: ICSD #: 073404

Peak height intensity, R-factor: 0.054, C.D. Cell: a=9.487, b=10.666, c=9.179, a/b=0.8895, c/b=0.8606, S.G.=P2₁2₁2₁(19), PSC: oP80, Mwt. 190.26, Volume[CD]: 928.81.

2θ	Int	h	k	l	2θ	Int	h	k	l	2θ	Int	h	k	l	2θ	Int	h	k	l
41.013	1	3	3	0	52.103	16	3	4	2	61.842	12	4	2	5	69.738	9	2	4	6
41.642	53	4	0	2	52.103	16	5	2	0	62.010	13	6	1	2	69.738	9	2	6	3
41.915	10	3	3	1	52.318	30	1	0	6	62.010	13	1	6	1	69.939	7	7	0	1
42.887	76	0	4	2	52.318	30	0	0	1	62.110	13	1	5	4	69.939	7	4	5	3
42.887	76	4	2	0	52.574	52	4	1	4	62.541	37	1	1	7	70.133	2	7	1	0
43.021	49	3	2	3	52.574	52	0	4	4	62.541	37	2	4	5	70.467	7	2	5	5
43.397	80	2	3	3	52.666	78	3	1	5	62.706	40	6	2	1	70.586	6	3	6	2
43.397	80	1	0	5	52.666	78	0	5	2	63.179	22	0	6	2	70.586	6	0	0	8
43.520	47	0	1	5	53.183	48	1	3	5	63.291	15	3	2	6	70.768	5	7	1	1
43.789	43	4	2	1	53.331	53	1	1	6	63.441	11	5	2	4	70.972	9	0	6	4
43.789	43	2	4	0	53.519	33	2	5	0	63.579	7	5	4	0	71.385	12	1	0	8
43.968	125	1	4	2	53.519	33	1	4	4	63.579	7	2	3	6	71.385	12	0	1	8
44.404	16	3	0	4	53.632	44	1	5	2	63.883	8	2	6	0	71.709	14	3	2	7
44.533	32	3	3	2	54.009	16	3	3	4	64.022	15	1	6	2	71.709	14	1	6	4
44.646	31	1	1	5	54.218	10	2	5	1	64.022	15	4	5	0	71.809	13	7	0	2
44.646	31	2	4	1	55.089	74	5	2	2	64.194	41	3	5	3	71.980	9	2	3	7
45.546	18	3	1	4	55.089	74	2	0	6	64.194	41	5	4	1					
46.120	25	1	3	4	55.362	36	4	3	3	64.373	27	0	2	7					
46.293	81	4	2	2	55.362	36	0	2	6	64.547	11	2	6	1					
47.097	104	0	4	3	55.543	60	4	2	4	64.756	14	6	2	2					
47.097	104	2	4	2	55.690	114	3	2	5	64.756	14	4	5	1					
47.749	4	2	1	5	55.690	114	4	4	0	65.037	10	2	1	7					
47.957	21	1	2	5	55.800	54	3	4	3	65.208	5	1	2	7					
48.120	19	1	4	3	55.964	32	2	3	5	65.575	5	4	0	6					
48.527	22	4	3	0	56.107	26	2	1	6	65.822	3	5	0	5					
48.648	17	3	3	3	56.294	65	2	4	4	66.329	6	4	3	5					
48.648	17	5	0	1	56.294	65	1	2	6	66.459	11	4	1	6					
48.846	14	3	2	4	56.399	36	2	5	2	66.459	11	2	6	2					
48.983	8	5	1	0	56.399	36	4	4	1	66.624	21	4	4	4					
48.983	8	3	4	0	57.362	37	1	5	3	67.162	2	6	3	1					
49.187	16	2	3	4	57.780	39	5	3	1	67.303	8	1	4	6					
49.320	59	4	3	1	58.310	21	6	0	0	67.303	8	1	6	3					
49.794	13	5	1	1	58.750	100	3	5	1	67.726	2	2	2	7					
49.794	13	3	4	1	59.253	7	6	1	0	67.726	2	3	3	6					
50.297	12	4	2	3	59.771	56	5	0	4	67.871	9	5	3	4					
50.399	7	0	5	1	59.876	53	5	3	2	67.969	16	6	2	3					
50.940	118	2	2	5	59.876	53	2	5	3	67.969	16	3	6	0					

Lampiran 17
Grafik Hasil Pengujian XRF Sampel 6A

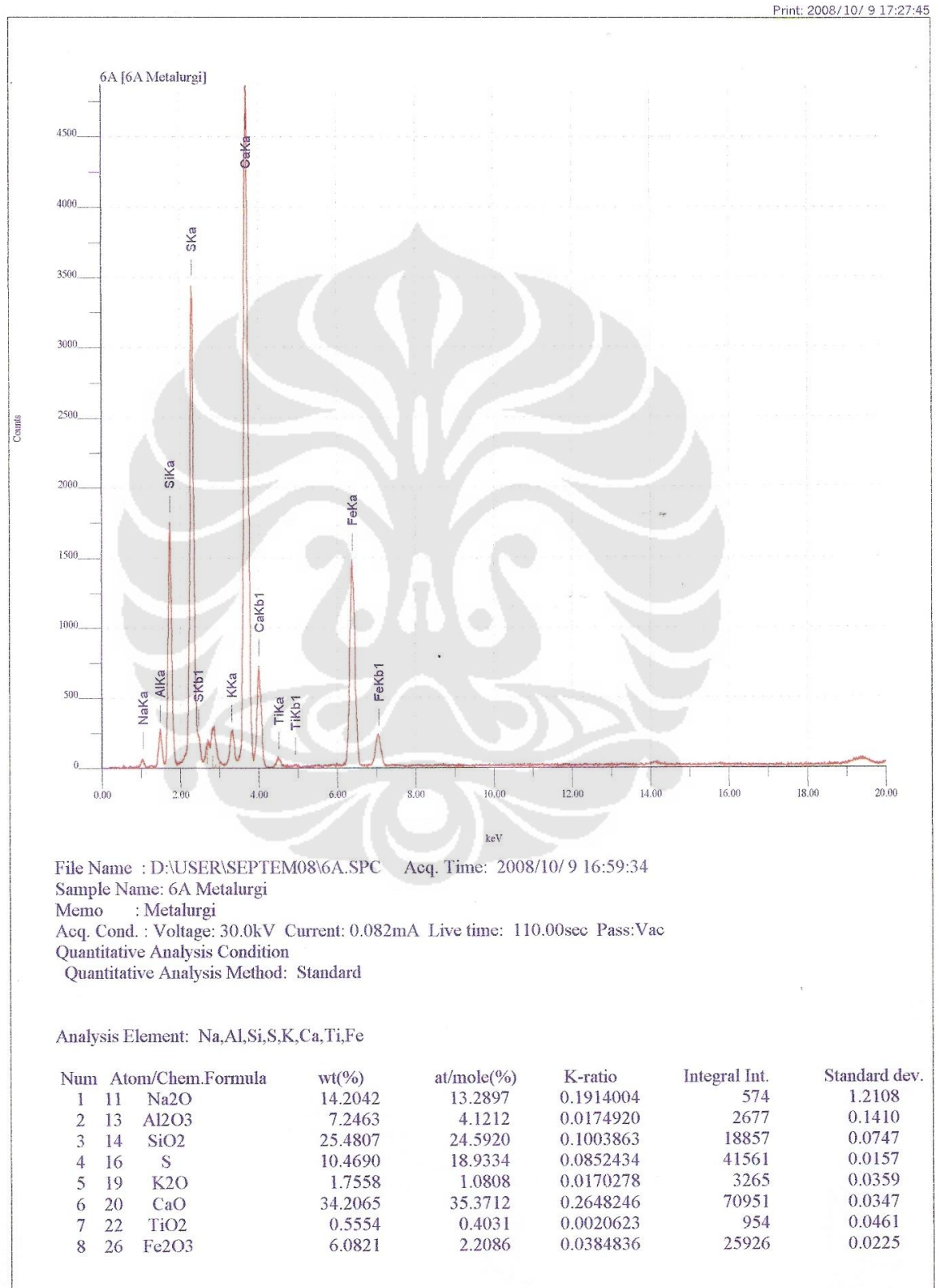
Print: 2008/10/ 9 17:27:27



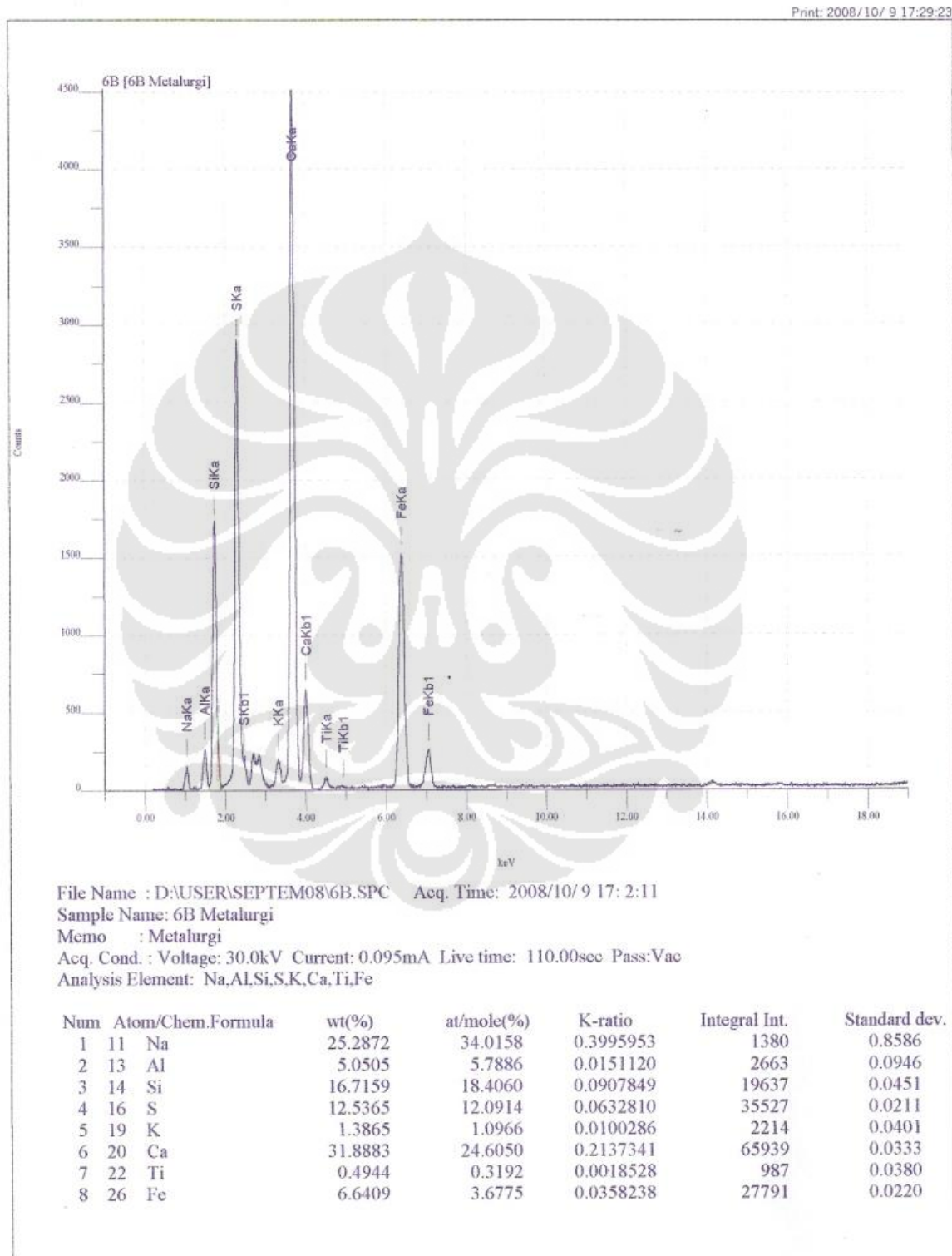
File Name : D:\USER\SEPTEM08\6A.SPC Acq. Time: 2008/10/9 16:59:34
 Sample Name: 6A Metalurgi
 Memo : Metalurgi
 Acq. Cond. : Voltage: 30.0kV Current: 0.082mA Live time: 110.00sec Pass:Vac
 Analysis Element: Na,Al,Si,S,K,Ca,Ti,Fe

Num	Atom/Chem.Formula	wt(%)	at/mole(%)	K-ratio	Integral Int.	Standard dev.
1	11 Na	12.8955	18.6498	0.1914004	574	1.0992
2	13 Al	5.0497	6.2225	0.0174920	2677	0.0983
3	14 Si	16.2306	19.2140	0.1003863	18857	0.0476
4	16 S	15.2524	15.8159	0.0852434	41561	0.0229
5	19 K	2.2781	1.9371	0.0170278	3265	0.0466
6	20 Ca	39.9236	33.1188	0.2648246	70951	0.0404
7	22 Ti	0.5963	0.4139	0.0020623	954	0.0495
8	26 Fe	7.7737	4.6281	0.0384836	25926	0.0288

(lanjutan)



Lampiran 18
Grafik Hasil Pengujian XRF Sampel 6B



(lanjutan)

Print: 2008/10/ 9 17:29: 6

