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LAMPIRAN



Lampiran 1. Proses Pemilahan Limbah Kaca Botol



Lampiran 2. Proses pengilingan kaca botol menjadi serbuk kaca



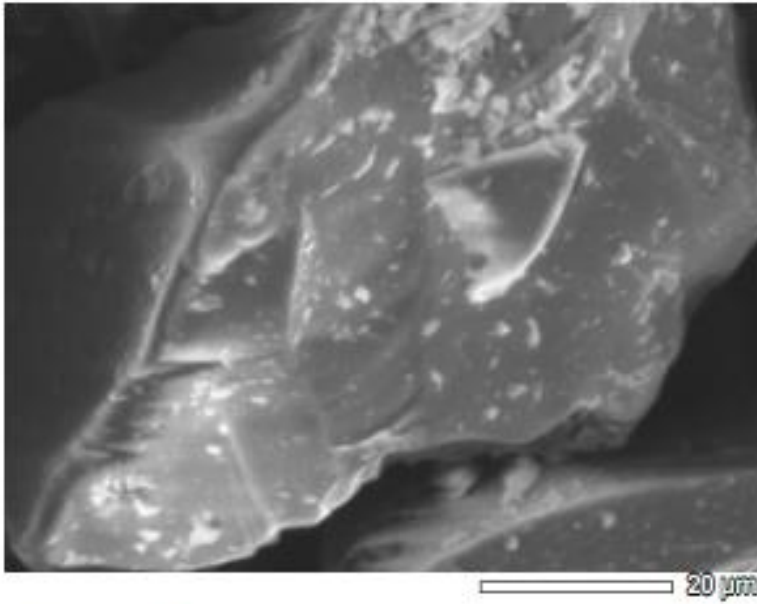
Lampiran 3. Proses Persiapan Material



Lampiran 4. Proses Pembuatan Benda Uji

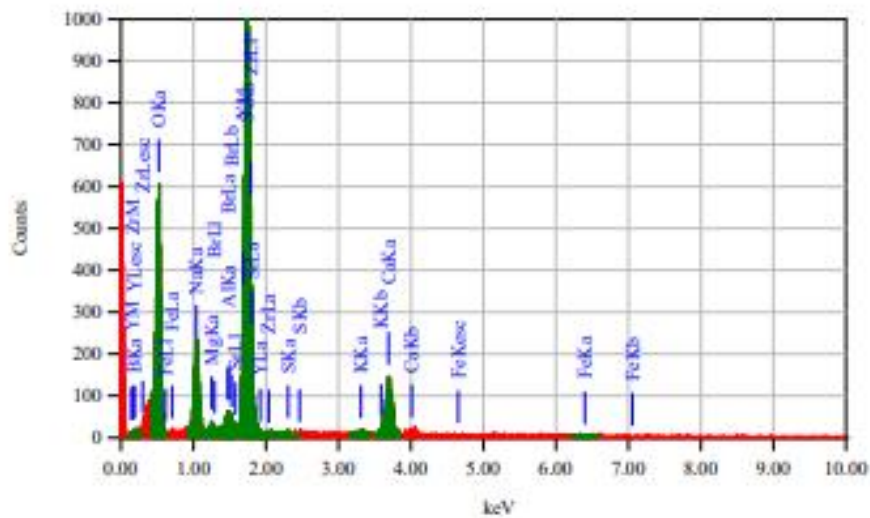


Lampiran 5. Proses Pengujian Benda Uji



```

Title       : IMG1
-----
Instrument  : JCM-6000PLUS
Volt       : 15.00 kV
Mag.      : x 1,500
Date      : 2023/05/09
Pixel     : 512 x 384
  
```



```

Acquisition Parameter
Instrument  : JCM-6000PLUS
Acc. Voltage : 15.0 kV
Probe Current: 1.00000 nA
PNA mode   : T3
Real Time  : 50.38 sec
Live Time  : 50.00 sec
Dead Time  : 0 %
Counting Rate: 602 cps
Energy Range : 0 - 20 keV
  
```

Thin Film Standardless Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.2139

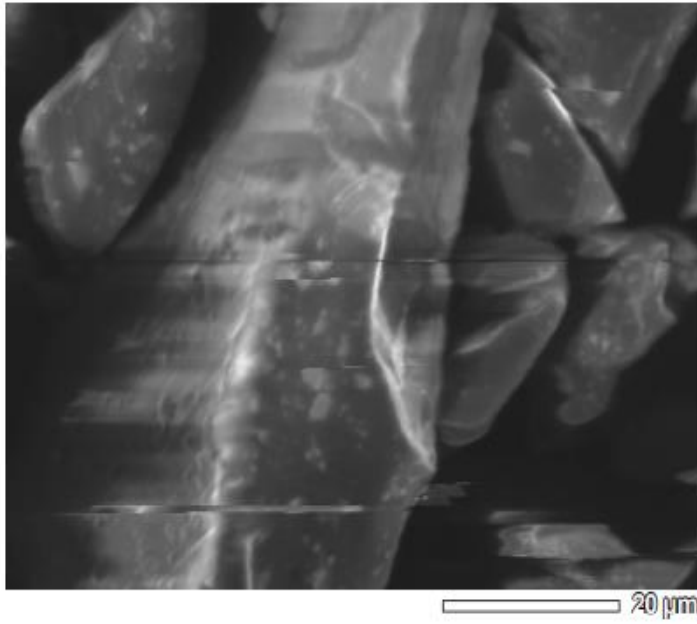
Total Oxide : 24.0

Element	(keV)	Mass%	Counts	Sigma	Mol%	Compound	Mass%	Cation	X
B K	0.183	3.60	59.11	0.38	10.85	B2O3	11.98	2.83	18.6733
O		45.23				NO			
Na K	1.041	4.03	1304.78	0.22	5.72	Na2O	5.44	1.49	0.9481
Mg K	1.253	0.42	140.56	0.10	1.14	MgO	0.70	0.15	0.9246
Al K	1.486	0.24	76.78	0.55	0.29	Al2O3	0.46	0.08	0.9748
Si K (ReL)	1.739	26.46	8116.57	1.01	61.40	SiO2	56.60	8.00	1.0000
S K	2.307	0.14	35.38	0.12	0.29	SO3	0.36	0.04	1.2539
K K	3.312	0.24	46.39	0.09	0.20	K2O	0.29	0.05	1.5846
Ca K	3.690	7.05	1276.16	0.41	11.47	CaO	9.87	1.49	1.6953
Fe K	6.398	0.10	8.34	0.12	0.12	FeO	0.13	0.02	3.8436
Br L	1.480	3.22	258.23	1.13	2.63	Br	3.22	0.00	3.8263
Sr L	1.806	5.64	440.35	1.19	4.20	SrO	6.67	0.55	3.9292
Y L*	1.922	2.52	179.43	0.54	0.92	Y2O3	3.20	0.24	4.3095
Zr L*	2.042	1.09	78.41	0.30	0.78	ZrO2	1.47	0.10	4.2717
Total		100.00			100.00		100.00	15.02	

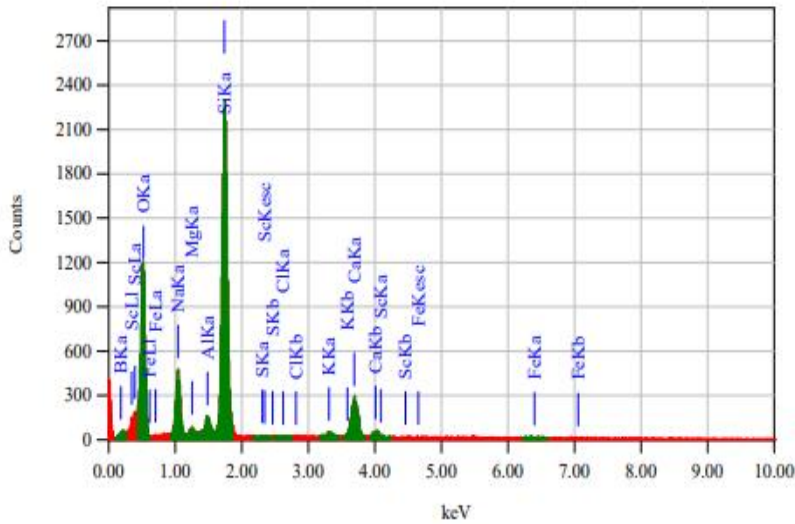
Lampiran 6. Pengujian XRF Botol Tanpa Perendaman

View004

JEOL 1/1



Title	: IMG1
Instrument	: JCM-6000PLUS
Volt	: 15.00 kV
Mag.	: x 1,500
Date	: 2023/05/23
Pixel	: 512 x 384



Acquisition Parameter	
Instrument	: JCM-6000PLUS
Acc. Voltage	: 15.0 kV
Probe Current	: 1.00000 nA
PHA mode	: T3
Real Time	: 50.54 sec
Live Time	: 50.00 sec
Dead Time	: 1 %
Counting Rate	: 1265 cps
Energy Range	: 0 - 20 keV

Thin Film Standardless Standardless Quantitative Analysis(Oxide)

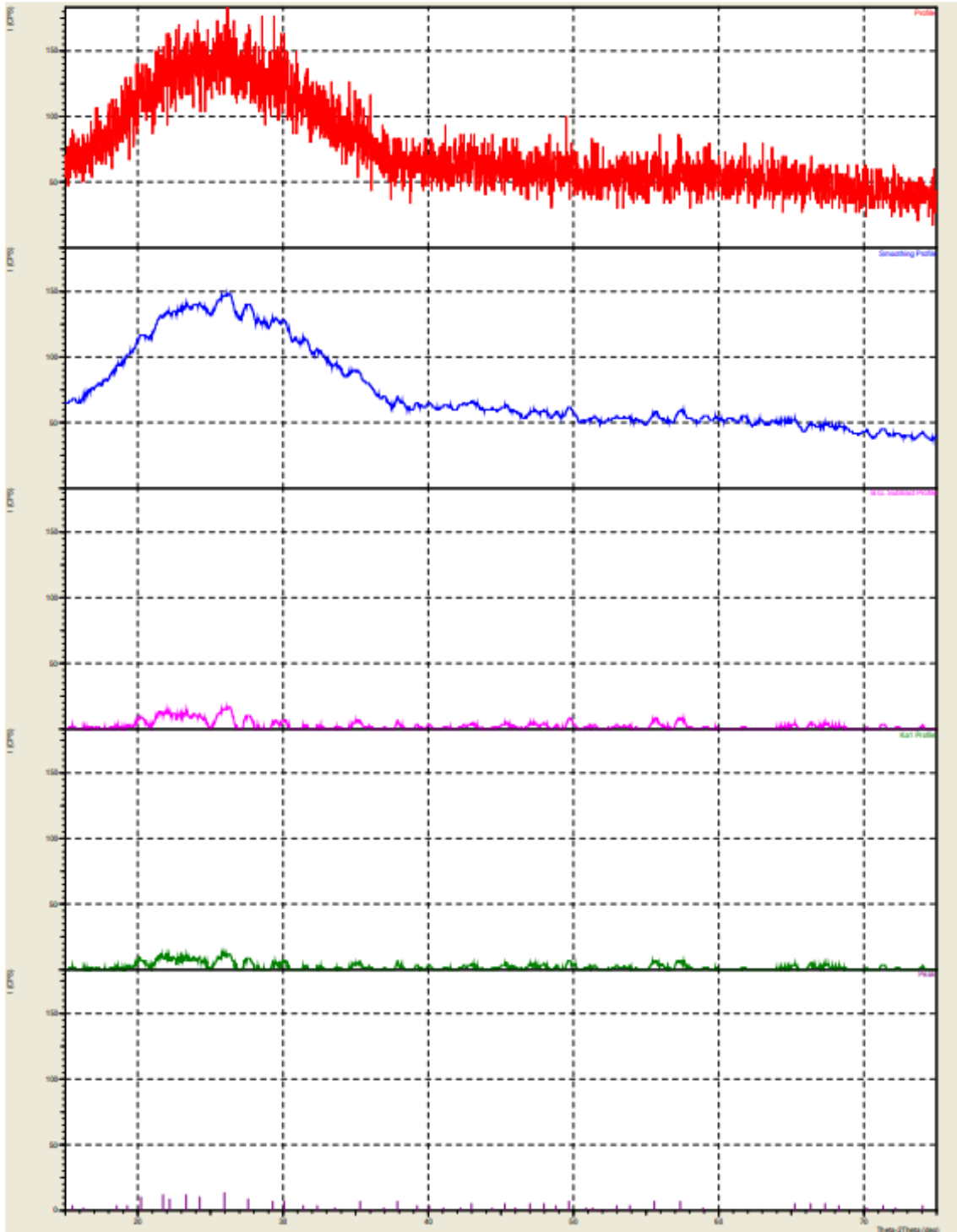
Fitting Coefficient : 0.1262

Total Oxide : 24.0

Element	(keV)	Mass%	Counts	Sigma	Mol%	Compound	Mass%	Cation	K
B K	0.183	5.02	159.00	0.31	14.36	B2O3	16.17	3.51	18.6733
O		50.78				ND			
Na K	1.041	4.37	2724.97	0.17	5.88	Na2O	5.89	1.44	0.9481
Mg K	1.253	0.49	314.81	0.08	1.25	MgO	0.82	0.15	0.9246
Al K	1.486	1.51	918.41	0.16	1.73	Al2O3	2.86	0.42	0.9748
Si K (Ref.)	1.739	28.88	17079.41	0.74	63.58	SiO2	61.79	7.78	1.0000
S K	2.307	0.12	57.82	0.08	0.24	SO3	0.31	0.03	1.2559
Cl K	2.621	0.09	39.17	0.04	0.16	Cl	0.09	0.00	1.3647
K K	3.312	0.63	236.65	0.09	0.50	K2O	0.76	0.12	1.5846
Ca K	3.690	7.81	2723.01	0.31	12.04	CaO	10.92	1.47	1.6953
Sc K	4.088	0.12	37.01	0.10	0.09	Sc2O3	0.19	0.02	1.9888
Fe K	6.398	0.16	24.16	0.11	0.17	FeO	0.20	0.02	3.8436
Total		100.00			100.00		100.00	14.97	

Lampiran 7. Hasil Pengujian XRF Botol dengan Perendaman

< Group: Standard Data: botol >



Lampiran 8. Hasil Pengujian XRD Botol



LABORATORIUM STRUKTUR & BAHAN
DEPARTEMEN TEKNIK SIPIL FAKULTAS TEKNIK
UNIVERSITAS HASANUDDIN

Jl. Poros Malino Km. 6 Bontomarannu, Kab. Gowa, 92171
e-mail: civil@unhas.ac.id

LAPORAN HASIL UJI TARIK

Jenis Contoh : Baja Tulangan Polos
Jumlah Contoh : Satu Potong
Dia. Nominal (mm) : 6 mm
Pekerjaan : Penelitian Glass Powder Team Lab. Riset Gempa

Diterima Tgl : 30 Januari 2023
Diuji Tgl : 30 Januari 2023
Dikirim :
S2 LAB.GEMPA
Diuji Oleh : Rahma Mardiana

Jenis Uji	Data Hasil Uji Tarik (Baja Tulangan Polos Ø6)	Data Hasil Uji Tarik (Baja Tulangan Polos Ø6)
Standar Uji tarik	SNI 8389 : 2017	SNI 8389 : 2017
Spesimen	SAMPEL 01	SAMPEL 02
Panjang Benda Uji (L1), mm	206	207
Panjang Benda Uji, mm	406	407
Berat Benda Uji, kg	0,078	0,078
Dia. Benda Uji, mm	5,6	5,6
Luas Penampang, mm ²	24,336	24,432
Beban Ulur, KN	11,00	12,40
Beban Tarik Maks., KN	15,40	19,60
Kekuatan Ulur, N/mm ²	452,01	507,52
Kekuatan Tarik Maks., N/mm ²	632,81	802,21
Panjang Putus (L2), mm	252	239
Regangan, %	22,3	15,5

Kesimpulan :

Berdasarkan data hasil pengujian sifat mekanis Baja Tulangan Polos Ø6, nilai kuat tarik dan kuat ulur telah memenuhi nilai yang disyaratkan untuk jenis kelas BJTP 280.

Hasil pengujian selengkapnya sebagai berikut:

Uji Tarik	Hasil Uji	Hasil Uji	Rata - Rata	Syarat BJTP 280 SNI 2052-2017
	SAMPEL 01	SAMPEL 02		
Batas Ulur, N/mm ²	452,01	507,52	479,77	280-405
Kuat Tarik, N/mm ²	632,81	802,21	717,51	Min. 350
Regangan, %	22,33	15,46	18,89	Min. 11

Catatan : Hasil pembacaan dikalikan dengan faktor koreksi = 2

Lampiran 9. Hasil Uji Tarik Tulangan Polos



LABORATORIUM STRUKTUR & BAHAN

DEPARTEMEN TEKNIK SIPIL FAKULTAS TEKNIK
UNIVERSITAS HASANUDDIN

Jl. Poros Malino Km. 6 Bontomarannu, Kab. Gowa, 92171

e-mail: civil@unhas.ac.id

LAPORAN HASIL UJI TARIK

Jenis Contoh : Baja Tulangan Ulir
Jumlah Contoh : Satu Potong
Dia. Nominal (mm) : 13 mm
Pekerjaan : Penelitian Glass Powder Team Lab. Riset Gempa

Diterima Tgl : 30 Januari 2023
Diuji Tgl : 30 Januari 2023
Dikirim :
S2 LAB.GEMPA
Diuji Oleh : Rahma Mardiana

Jenis Uji	Data Hasil Uji Tarik (Baja Tulangan Ulir D13)	Data Hasil Uji Tarik (Baja Tulangan Ulir D13)
Standar Uji tarik	SNI 8389 : 2017	SNI 8389 : 2017
Spesimen	SAMPEL 01	SAMPEL 02
Panjang Benda Uji (L1), mm	205	203
Panjang Benda Uji, mm	405	403
Berat Benda Uji, kg	0,409	0,395
Dia. Benda Uji, mm	12,8	12,6
Luas Penampang, mm ²	128,518	124,923
Beban Ulur, KN	49,80	53,20
Beban Tarik Maks., KN	73,20	76,40
Kekuatan Ulur, N/mm ²	387,49	425,86
Kekuatan Tarik Maks., N/mm ²	569,57	611,58
Panjang Putus (L2), mm	255	248
Regangan, %	24,4	22,2

Kesimpulan :

Berdasarkan data hasil pengujian sifat mekanis Baja Tulangan Polos D13, nilai kuat tarik dan kuat ulur telah memenuhi nilai yang disyaratkan untuk jenis kelas BJTS 480B.

Hasil pengujian selengkapnya sebagai berikut:

Uji Tarik	Hasil Uji	Hasil Uji	Rata - Rata	Syarat BJTS 280B SNI 2052-2017
	SAMPEL 01	SAMPEL 02		
Batas Ulur, N/mm ²	387,49	425,86	406,68	420-545
Kuat Tarik, N/mm ²	569,57	611,58	590,57	Min. 525
Regangan, %	24,39	22,17	23,28	Min. 14

Catatan : Hasil pembacaan dikalikan dengan faktor koreksi = 2

Lampiran 10. Hasil Uji Tarik Tulangan Ulir