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LAMPIRAN

LAMPIRAN 1 PENGENCERAN ASAM SULFAT (H_2SO_4)

Pengenceran Asam Sulfat (H_2SO_4) 98%

Densitas = 1,83 g/mL

Massa molekul relatif (Mr) = 98 g/mL

V larutan = 1000 mL

Molaritas (M) $= \frac{\%massa\ x\ densitas\ x\ V}{Mr}$

$= \frac{98\%\ x\ 1{,}83\frac{g}{mL}\ x\ 1000\ mL}{98\ g/mol}$

= 18,3

*Larutan 1 M

$M_1V_1 = M_2V_2$

$18{,}3\ x\ V_1 = 1\ x\ 100\ mL$

$V_1 = \frac{1\ x\ 100mL}{18{,}3}$

= 5,5 mL

*Larutan 2 M

$M_1V_1 = M_2V_2$

$18{,}3\ x\ V_1 = 2\ x\ 200\ mL$

$V_1 = \frac{1\ x\ 200mL}{18{,}3}$

= 21,9 mL

*Larutan 4 M

$M_1V_1 = M_2V_2$

$18{,}3\ x\ V_1 = 4\ x\ 300\ mL$

$V_1 = \frac{1\ x\ 300mL}{18{,}3}$

= 65,6 mL

*Larutan 6 M

$M_1V_1 = M_2V_2$

$18{,}3\ x\ V_1 = 6\ x\ 400\ mL$

$V_1 = \frac{1\ x\ 400mL}{18{,}3}$

= 131,1 mL

LAMPIRAN 2

HASIL *ANALISIS ATOMIC ABSORPTION SPECTROMETER* (AAS)

LABORATORIUM PENELITIAN DAN PENGEMBANGAN SAINS
FAKULTAS MATEMATIKA DAN ILMU PENGETAHUAN ALAM
UNIVERSITAS HASANUDDIN
Jl. Perintis Kemerdekaan Km. 10 Tamalanrea, Makassar 90245
Telp. 0411-586016 • Fax. 0411-588551 • Email : lpps.fmipa.unhas@gmail.com

KAN
Komite Akreditasi Nasional
Laboratorium Penguji
LP-1484-IDN

LAPORAN HASIL PENGUJIAN

CERTIFICATE OF ANALYSIS

Nomor Pekerjaan : **LPPS.AJ-2306-27/11-Rev**
Job Number

Dipersembahkan Kepada
Presented To

Kepada Yth *Attention*	**: Diva Vareliya Suharman**	**Jabatan** *Job Title*	**: Peneliti**
Nama Pelanggan *Customer Name*	**: Diva Vareliya Suharman**	**Tujuan Pengujian** *Purpose of analysis*	**: Analisis Logam**
Alamat/Universitas *Address/University*	**: Jl. Royal Spring E11/30**	**No. Faks/** *Fax No.*	**: -**
Tanggal Sampel Diterima *Date of Sample Receipt*	**: 26 Juni 2023**	**No. Telp./** *Phone No.*	**: 089677312996**
Email *Email*	**: diva.varelya@gmail.com**	**Tanggal Sampel Dianalisis** *Date of Sample Analysed*	**: 5 – 10 Juli 2023**
Nama Pengujian *Name of analysis*	**: Analisis Logam Besi (Fe) pada Sampel Padatan dan Logam Magnesium (Mg) pada Sampel Larutan dan Padatan Menggunakan AAS**	**Total Halaman** *Total of pages*	**: 2**

Hasil hanya berhubungan dengan contoh yang diuji dan laporan ini tidak boleh digandakan kecuali seluruhnya.
The result relate only to the samples tested and this report shall not be reproduced except in full

LABORATORIUM PENELITIAN DAN PENGEMBANGAN SAINS
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LAPORAN HASIL PENGUJIAN
CERTIFICATE OF ANALYSIS

Nomor Pekerjaan **: LPPS.AJ-2306-27/11-Rev**

I. Pelanggan / *Principal*
- 1.1 Nama / *Name* : Diva Vareliya Suharman
- 1.2 Alamat / *Address* : Jl. Royal Spring E11/30
- 1.3 Telepon / *Phone* : 089677312996
- 1.4 Personil Penghubung / *Contact Person* : -
- 1.5 Email / *Email* : diva.varelya@gmail.com

II. Contoh Uji / *Sample*
- 2.1 Kode Sampel / *Sampel Code* : LPPS.A-2306-27/11a – 11k
- 2.2 Kemasan / *Packaging* : Botol Kaca dan Plastik Sampel
- 2.3 Nama Sampel / *Sample Name* : Larutan (10), Padatan (1)
- 2.4 Jumlah Sampel / *Number of Sample* : 11
- 2.5 Tanggal Sampling / *Date of Sampling* : -
- 2.6 Diterima / *Date of Received* : 26 Juni 2023
- 2.7 Tanggal Uji / *Date of Analysis* : 5 – 10 Juli 2023
- 2.8 Jenis Uji / *Type of Analysis* : Logam Fe dan Mg

III. Hasil Uji / *Result*

Kode Sampel	Nama Sampel	Satuan	Konsentrasi Logam	
			Mg	Fe
30, 60º, 1 M	LPPS.A-2306-27/11a	mg/L	21825	-
30, 60º, 2 M	LPPS.A-2306-27/11b	mg/L	22519	-
30, 60º, 4 M	LPPS.A-2306-27/11c	mg/L	17878	-
30, 60º, 6 M	LPPS.A-2306-27/11d	mg/L	26643	-
60, 70º, 2 M	LPPS.A-2306-27/11e	mg/L	25956	-
60, 70º, 4 M	LPPS.A-2306-27/11f	mg/L	27376	-
60, 70º, 6 M	LPPS.A-2306-27/11g	mg/L	24666	-
90, 80º, 4 M	LPPS.A-2306-27/11h	mg/L	27285	-
90, 80º, 6 M	LPPS.A-2306-27/11i	mg/L	29229	-
120, 90º, 6 M	LPPS.A-2306-27/11j	mg/L	33242	-
sampel awal	LPPS.A-2306-27/11k	mg/kg	200904.91	249389.69

Makassar, 9 Agustus 2023
Penanggungjawab Mutu

Prof. Dr. Nurluk Hariani Soekamto, MS
NIP. 19601215 198702 2 001

Catatan:
- Hasil Uji hanya berlaku untuk contoh tersebut di atas
- Dilarang mengutip/menyalin sebagian isi hasil uji ini
- LHU No. LPPS.AJ-2306-27/11-Rev adalah revisi dari LHU No. LPPS.AJ-2306-27/11
- LHU No. LPPS.AJ-2306-27/11 sudah tidak berlaku sejak diterbitkannya LHU No. LPPS.AJ-2306-27/11-Rev

PT. AISPEKTRA LABORATORY SERVICES
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Jl Tamalanrea Raya, Makassar 90245 Sulawesi Selatan
Telp/Fax. +62 4118994478 Email : info@aispektra.co.id

REPORT OF ANALYSIS
(Laporan Analisis)

Certificate Number/*Nomor Sertifikat*	: 000312023
Customer/*Pelanggan*	: DIVA VARELIYA
Subject / *Hal*	: Mineral Analysis
Description of Sample/ *Keterangan Sampel*	: Matte Slag
Number of Sample (s) / *Jumlah Sampel*	: 10 (Ten)
Form of Sample / *Bentuk Sampel*	: Liquid
Test Required / *Analisa uji*	: Elemental (Fe)
Date Received/ *Tanggal terima*	: 07/07/2023
Date of Analysis / *Tanggal Analisa*	: 30/07/2023
Method of Analysis/ *Metode analisa*	: AAS
Reference / *Referensi*	: -

RESULT

SAMPLE ID	Fe (mg/L)	Ni (mg/L)	Co(mg/L)	Al (mg/L)	Remarks
DV60702	5330	NR	NR	NR	
DV30604	4268	NR	NR	NR	
DV60104	7269	NR	NR	NR	
DV50804	7190	NR	NR	NR	
DV30601	3522	NR	NR	NR	
DV30606	6548	NR	NR	NR	
DV60706	7538	NR	NR	NR	
DV120906	9306	NR	NR	NR	
DV90806	7360	NR	NR	NR	
DV30102	3657	NR	NR	NR	

Catatan : NR = NOT REPORTED

HASIL ANALISA TERSEBUT DIATAS HANYA MERUJUK PADA SAMPEL YANG DISERAHKAN DIMANA PENGAMBILAN SAMPEL TERSEBUT TIDAK DILAKUKAN OLEH AISPEKTRA LABORATORY

ANALIS

FAJRIN AHMAD, A.Ma

LAMPIRAN 3
PERHITUNGAN LAJU PELINDIAN

Laju pelindian magnesium dan besi dihitung menggunakan rumus efisiensi pelindian dalam Dong *et al*., (2023) pada persamaan 4 berikut:

$$\eta = \frac{C_i \ x \ V}{m \ x \ W_i} \ x \ 100$$

Dimana:

η = Laju pelindian (%)

C_i = Konsentrasi logam (mg/L) dalam pregnant leach solution (PLS)

V = Volume PLS (L)

m = Massa sampel (Kg)

W_i = Kadar logam (mg/Kg)

Laju Pelindian Magnesium (Mg)

Volume PLS (V) = 0,025 L

Mass sampel (m) = 0,01 Kg

Kadar Mg (W_i) = 20,090491 mg/Kg

1. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 1 M (C_i= 21.825 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{21.825 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 27,16\%$

2. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 2 M (C_i= 22.519 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{22.519 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 28,02\%$

3. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 4 M (C_i= 17.878 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{17.878 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 22,25\%$

4. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 6 M (C_i= 26.643 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{26.643 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 33,15\%$

5. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 2 M (C_i= 25.956 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{25.956 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 32,30\%$

6. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 4 M (C_i= 27.376 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{27.376 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 34,07\%$

7. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 6 M (C_i= 24.666 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{24.666 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 30,69\%$

8. Laju Pelindian pada kondisi pelindian 90 menit, 80°C, 4 M (C_i= 27.285 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{27.285 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 33,95\%$

9. Laju Pelindian pada kondisi pelindian 90 menit, 80°C, 6 M (C_i= 29.229 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{29.229 \times 0,025}{0,01 \times 20,090491}$ x 100%

$= 36,37\%$

10. Laju Pelindian pada kondisi pelindian 120 menit, 80°C, 6 M(C_i= 33.242 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{33.242 \times 0{,}025}{0{,}01 \times 20{,}090491}$ x 100%

= 41,37%

Laju Pelindian Besi (Fe)

Volume PLS (V) = 0,025 L

Mass sampel (m) = 0,01 Kg

Kadar Fe (W_i) = 24,938969 mg/Kg

1. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 1 M (C_i= 3.522 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{3.522 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 3,53%

2. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 2 M (C_i= 3.657 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{3.657 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 3,67%

3. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 4 M (C_i= 4.268 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{4.268 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 4,28%

4. Laju Pelindian pada kondisi pelindian 30 menit, 60°C, 6 M (C_i= 6.548 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{6.548 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 6,56%

5. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 2 M (C_i= 5.330 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{5.330 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 5,34%

6. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 4 M (C_i= 7.269 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{7.269 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 7,29%

7. Laju Pelindian pada kondisi pelindian 60 menit, 70°C, 6 M (C_i= 7.538 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{7.538 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 7,56%

8. Laju Pelindian pada kondisi pelindian 90 menit, 80°C, 4 M (C_i= 7.190 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{7.190 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 7,21%

9. Laju Pelindian pada kondisi pelindian 90 menit, 80°C, 6 M (C_i= 7.360 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{7.360 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 7.38%

10. Laju Pelindian pada kondisi pelindian 120 menit, 80°C, 6 M(C_i= 9.306 mg/L)

Laju Pelindian (%) $= \frac{C_i \times V}{m \times W_i}$ x 100%

$= \frac{9.306 \times 0{,}025}{0{,}01 \times 24{,}938969}$ x 100%

= 9,33%

LAMPIRAN 4
HASIL ANALISIS X-RAY DIFFRACTION (XRD)

HASIL ANALISIS *X-RAY DIFFRACTION* (XRD) SAMPEL AWAL

Match! Phase Analysis Report

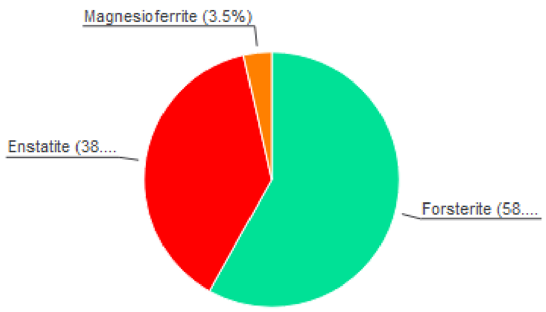
Sample: DV-SA

Sample Data

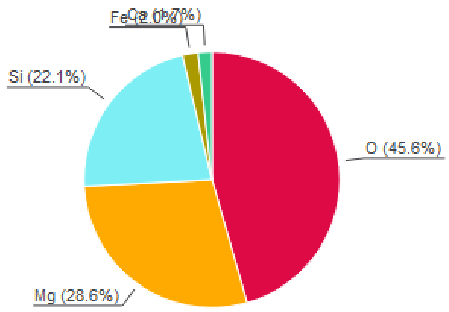
File name	DV-SA.txt
File path	C:/Users/ACER/Documents/MALY/OTW SARJANA TEKNIK/Analisis/XRD Analisis/DV-SA
Data collected	Aug 2, 2023 16:25:44
Data range	5.000° - 70.000°
Original data range	5.000° - 70.000°
Number of points	3251
Step size	0.020
Rietveld refinement converged	No
Alpha2 subtracted	No
Background subtr.	No
Data smoothed	Yes
Radiation	X-rays
Wavelength	1.541874 Å

Analysis Results

Phase composition (Weight %)



Elemental composition (Weight %)



Index	*Amount (%)*	*Name*	*Formula sum*
A	58.1	Forsterite	Mg2 O4 Si
B	38.3	Enstatite	Ca0.23 Mg1.77 O6 Si2
C	3.5	Magnesioferrite	Fe2 Mg O4
	21.5	*Unidentified peak area*	

Amounts calculated by RIR (Reference Intensity Ratio) method

Element	*Amount (weight %)*
O	*45.6%(*)*
Mg	28.6%
Si	22.1%
Fe	2.0%
Ca	1.7%
**LE (sum)*	*45.6%*

Details of identified phases

A: Forsterite (58.1 %)

Formula sum	Mg2 O4 Si
Entry number	96-901-6386
Figure-of-Merit (FoM)	0.666064
Total number of peaks	720
Peaks in range	144
Peaks matched	84
Intensity scale factor	0.27
Space group	P b n m
Crystal system	orthorhombic
Unit cell	a= 4.7534 Å b= 10.1902 Å c= 5.9783 Å
I/Ic	0.76
Calc. density	3.227 g/cm^3
Reference	Fujino K., Sasaki S., Takeuchi Y., Sadanaga R., "X-ray determination of electron distributions in forsterite, fayalite and tephroite", Acta Crystallographica, Section B **37(3)**, 513-518 (1981)

B: Enstatite (38.3 %)*

Formula sum	Ca0.23 Mg1.77 O6 Si2
Entry number	96-900-5545
Figure-of-Merit (FoM)	0.684390*
Total number of peaks	998
Peaks in range	353
Peaks matched	206
Intensity scale factor	0.23*
Space group	P 1 21/c 1
Crystal system	monoclinic
Unit cell	a= 9.6900 Å b= 8.8620 Å c= 5.2290 Å β= 108.310 °
I/Ic	0.95
Calc. density	3.185 g/cm³
Reference	Tribaudino M., Nestola F., "Average and local structure in P2_1/c clinopyroxenes along thejoin diopside-enstatite (CaMgSi2O6-Mg2Si2O6)Sample: Di23En77 (split model)", European Journal of Mineralogy **14**, 549-555 (2002)

C: Magnesioferrite (3.5 %)

Formula sum	Fe2 Mg O4
Entry number	96-900-3798
Figure-of-Merit (FoM)	0.000000
Total number of peaks	72
Peaks in range	22
Peaks matched	12
Intensity scale factor	0.09
Space group	F d -3 m
Crystal system	cubic
Unit cell	a= 8.4479 Å
I/Ic	4.23
Calc. density	4.407 g/cm³
Reference	Antao S. M., Hassan I., Crichton W. A., Parise J. B., "Effects of high pressure and high temperature on cation ordering inmagnesioferrite, MgFe2O4, using in situ synchrotron X-ray powderdiffraction up to 1430 K and 6 GPaSample: T = 1430 K, P = 3 GPa during heating", American Mineralogist **90**, 1500-1505 (2005)

(*) 2theta values have been shifted internally for the calculation of the amounts, the intensity scaling factors as well as the figure-of-merit (FoM), due to the active search-match option 'Automatic zero point adaption'.

Candidates

Name	***Formula***	***Entry No.***	***FoM***
Terbium trilithium dibismuthide	Bi2 Li3 Tb	96-202-0127	0.4967
Cu (N H3)4 (Cu Cl2)2 H2 O	Cl4 Cu3 H14 N4 O	96-403-1221	0.4895
Gadolinium trilithium dibismuthide	Bi2 Gd Li3	96-202-0126	0.4853
V B O3	B O3 V	96-720-9473	0.4692
Fe B O3	B Fe O3	96-151-1132	0.4658
(Nd2 Ni Si3)0.5	Nd Ni0.5 Si1.5	96-153-8821	0.4641
Samarium trilithium dibismuthide	Bi2 Li3 Sm	96-202-0125	0.4591
(Ce5 Co2 Si8)0.2	Ce Co0.4 Si1.6	96-153-9777	0.4560
	H8 Mg O8 Te	96-210-8843	0.4553
	H8 Mg O8 Te	96-210-8844	0.4541
	H8 Mg O8 Te	96-210-8845	0.4541
AMMONIUM TETRATHIOMOLYBDATE	H8 Mo N2 S4	96-100-4020	0.4260
	Mo N2 S4	96-901-5642	0.4260
diammonium thiomolybdate	H8 Mo N2 S4	96-222-4948	0.4135
(N H4)2 (Mo S4)	H8 Mo N2 S4	96-722-1378	0.4121
Mn3 (Fe (C N)6)2 (H2 O)2	C12 H4 Fe2 Mn3 N12 O2	96-152-6337	0.4094
diammonium tetrathiotungstate	H8 N2 S4 W	96-220-4583	0.4078
(Co Th2 Si3)0.5	Co0.5 Si1.5 Th	96-153-9527	0.4024
Sodium hexafluorotechnetate(IV)	F6 Na2 Tc	96-433-5230	0.4006
Ammonium hexafluorotechnetate(IV)	F6 N2 Tc	96-433-5229	0.3960
	Au0.98 Si3.02 Yb2	96-721-1071	0.3926
Gaspeite	C Ni O3	96-900-0103	0.3917
Nickel carbonate (Gaspeite)	C Ni O3	96-154-8824	0.3888
Gaspeite	C Ni O3	96-900-7713	0.3887
(Ni2 Pr5 Si8)0.2	Ni0.4 Pr Si1.6	96-153-8814	0.3871
lanthanum ytterbium sulfide	La3 S9 Yb3	96-400-1296	0.3861
(Mn1.8 Mg0.2) (Y0.72 Ce0.28) (O H)4 (As0.95 Si0.05 O4)	As0.95 Ce0.28 H4 Mg0.2 Mn1.8 O8 Si0.05 Y0.72	96-152-8743	0.3836
	Li4 Mo O5	96-153-5532	0.3617
Ce (Fe0.5 Si1.5)	Ce Fe0.5 Si1.5	96-152-9995	0.3613
	B2 S3	96-151-0828	0.3609
Silver mercury vanadate	Ag6 Hg6 O16 V4	96-430-8659	0.3525
	F6 K2 Zr	96-350-0049	0.3497
K2ZrF6	F6 K2 Zr	96-451-7764	0.3497
5-Methyl-3-(4-nitrophenyl)-1,2,4-oxadiazole	C9 H7 N3 O3	96-155-8439	0.3351
cesium uranyl copper phosphate	Cs3.14 Cu O27 P5 U3	96-433-1941	0.3305
Cs3.14 ((U O2)3 Cu H3.86 (P O4)5) (H2 O)	Cs3.14 Cu H5.86 O27 P5 U3	96-434-3906	0.3293
(N D4)4 D2 (Se O4)3	D18 N4 O12 Se3	96-152-6064	0.3248
	H13 N3 O8 Se2	96-200-0490	0.3197
Neodymium copper oxide (1/1/2.9)	Cu Nd O2.93	96-100-1666	0.3177
(As0.33 Cu0.67) Sr2 Y Cu2 O6.88	As0.33 Cu2.67 O6.88 Sr2 Y	96-152-6462	0.3143
Barium catena-pentafluoroaluminate - \b	Al Ba F5	96-100-0131	0.3134
Manganese carbodiimide	C Mn N2	96-110-0722	0.3126

(Ca0.73 Sr0.27) (V O3)	Ca0.73 O3 Sr0.27 V	96-152-1036	0.3106
(N H4)4 H2 (Se O4)3	H18 N4 O12 Se3	96-152-6232	0.3101
Dimagnesium catena-disilicate (Enstatite)	Mg2 O6 Si2	96-100-0048	0.0000
Iron silicate - \a (Fayalite)	Fe2 O4 Si	96-100-0065	0.0000
Magnesium iron silicate * (Enstatite ferroan)	Fe0.155 Mg0.845 O3 Si	96-101-1019	0.0000
Aluminium hydroxide (Gibbsite)	Al H3 O3	96-101-1082	0.0000
Trimagnesium dihydroxide phyllo-tetrasilicate (Talc 2M)	H2 Mg3 O12 Si4	96-101-1153	0.0000
Magnesium diiron(III) oxide (Magnesioferrite)	Fe2 Mg O4	96-101-1242	0.0000
Magnesium diiron(III) oxide (Magnesioferrite)	Fe2 Mg O4	96-101-1246	0.0000
Aluminium hydroxide (Gibbsite)	Al H3 O3	96-120-0017	0.0000

and 355 others...

Search-Match

Settings

Reference database used	COD-Inorg 2022.11.07
Automatic zeropoint adaptation	Yes
Downgrade entries with low scaling factors	Yes
Minimum figure-of-merit (FoM)	0.31
2theta window for peak corr.	0.30 deg.
Minimum rel. int. for peak corr.	0
Parameter/influence 2theta	0.50
Parameter/influence intensities	0.50
Parameter multiple/single phase(s)	0.50

Criteria for entries added by user

Reference:

Entry number:

96-154-4616;96-154-4617;96-900-0167;96-900-0168;96-900-0268;96-900-0315;96-900-0316;96-900-
0317;96-900-0318;96-900-0319;96-900-0320;96-900-0321;96-900-0322;96-900-0323;96-900-0324;96-900-
0325;96-900-0326;96-900-0327;96-900-0535;96-900-0536;96-900-0537;96-900-0538;96-900-0539;96-900-
0540;96-900-0541;96-900-0542;96-900-0788;96-900-1667;96-900-1668;96-900-1669;96-900-1670;96-900-
1671;96-900-4323;96-900-4324;96-900-4325;96-900-4326;96-900-4327;96-900-4328;96-900-4329;96-900-
4330;96-900-4331;96-900-4332;96-900-4333;96-900-7378;96-901-0755;96-901-0756;96-901-0757;96-901-
0758;96-901-0759;96-901-0760;96-901-0761;96-901-0762;96-901-0763;96-901-0764;96-901-0765;96-901-
0766;96-901-0776;96-901-0777;96-901-0778;96-901-0779;96-901-0780;96-901-0781;96-901-1462;96-901-
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7273;96-900-7274

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	9.84	8.9928	43.78	2.36	0.2097	B

2	17.26	5.1374	170.95	17.48	0.3986	A
3	18.37	4.8305	52.68	3.34	0.2474	C
4	19.43	4.5687	43.22	4.83	0.4353	B
5	20.49	4.3344	30.30	5.79	0.7441	A,B
6	21.77	4.0832	87.80	10.72	0.4757	B
7	22.75	3.9094	238.55	19.80	0.3235	A
8	23.79	3.7399	93.86	6.68	0.2774	A,B
9	25.36	3.5122	268.87	22.69	0.3289	A
10	26.55	3.3570	75.30	6.85	0.3547	B
11	28.02	3.1844	307.58	23.04	0.2919	B
12	29.72	3.0057	345.59	26.84	0.3027	A,B,C
13	30.30	2.9497	63.07	8.58	0.5304	B
14	31.02	2.8830	304.64	21.31	0.2726	B
15	32.15	2.7843	545.71	53.32	0.3808	A,B
16	33.24	2.6954	28.64	1.05	0.1429	
17	34.49	2.6003	80.28	3.10	0.1505	A,B
18	35.53	2.5264	548.80	69.29	0.4921	A,B,C
19	36.38	2.4698	1000.00	73.70	0.2872	A,B
20	37.59	2.3929	35.49	3.76	0.4132	A,B
21	38.10	2.3619	62.30	4.65	0.2907	A,B
22	38.73	2.3251	63.65	3.16	0.1936	A,B
23	39.54	2.2793	221.10	18.55	0.3269	B
24	39.89	2.2598	159.12	9.37	0.2295	A,B
25	40.64	2.2200	26.23	1.94	0.2881	B
26	41.62	2.1702	46.90	4.17	0.3467	A,B
27	42.43	2.1306	74.98	11.55	0.6005	B
28	43.54	2.0789	42.18	2.40	0.2215	B
29	44.52	2.0352	70.11	14.76	0.8205	A,B
30	45.34	2.0002	26.69	3.76	0.5488	B
31	46.48	1.9538	30.61	2.18	0.2771	A,B
32	47.22	1.9250	25.40	1.19	0.1828	A,B,C
33	48.17	1.8892	38.23	1.57	0.1600	B
34	48.78	1.8669	10.70	0.35	0.1273	A,B
35	50.17	1.8185	40.48	4.57	0.4396	A,B
36	52.03	1.7578	386.52	47.84	0.4823	A,B
37	54.68	1.6786	77.50	7.30	0.3672	A,B
38	55.76	1.6486	73.00	12.66	0.6759	B
39	56.59	1.6263	116.34	10.01	0.3352	A,B,C
40	56.92	1.6179	71.84	5.03	0.2730	A,B
41	57.16	1.6116	57.38	3.03	0.2060	A,B
42	57.56	1.6013	83.36	7.92	0.3702	A,B
43	58.36	1.5813	58.18	6.47	0.4334	A,B
44	61.06	1.5176	53.78	19.17	1.3893	A,B
45	61.62	1.5052	171.32	14.16	0.3221	A,B
46	62.34	1.4895	151.04	18.88	0.4871	A,B,C
47	62.94	1.4767	90.63	10.68	0.4593	A,B
48	64.47	1.4453	33.81	4.09	0.4716	B
49	66.61	1.4040	103.76	12.30	0.4620	A,B,C
50	67.06	1.3957	41.37	4.30	0.4051	A,B
51	67.85	1.3813	44.44	3.97	0.3483	A,B
52	69.28	1.3563	71.97	8.24	0.4462	A,B

Integrated Profile Areas

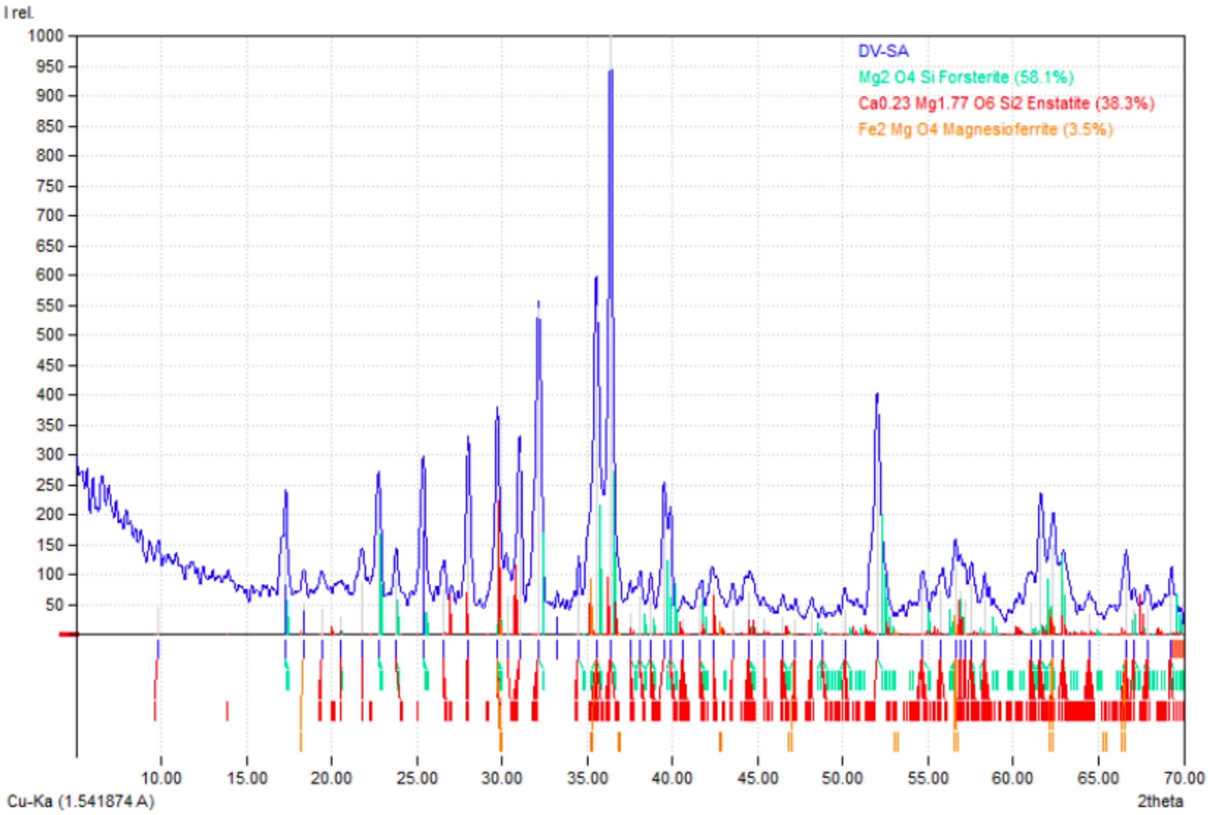
Based on calculated profile

Profile area	***Counts***	***Amount***
Overall diffraction profile	73690	100.00%
Background radiation	40060	54.36%
Diffraction peaks	33630	45.64%
Peak area belonging to selected phases	17819	24.18%
Peak area of phase A (Forsterite)	*9828*	*13.34%*
Peak area of phase B (Enstatite)	*6838*	*9.28%*
Peak area of phase C (Magnesioferrite)	*1154*	*1.57%*
Unidentified peak area	15811	21.46%

Peak Residuals

Peak data	***Counts***	***Amount***
Overall peak intensity	665	100.00%
Peak intensity belonging to selected phases	653	98.30%
Unidentified peak intensity	11	1.70%

Diffraction Pattern Graphics


I rel.
DV-SA
Mg2 O4 Si Forsterite (58.1%)
Ca0.23 Mg1.77 O6 Si2 Enstatite (38.3%)
Fe2 Mg O4 Magnesioferrite (3.5%)
Cu-Ka (1.541874 A)
2theta

HASIL ANALISIS *X-RAY DIFFRACTION* (XRD) SAMPEL RESIDU

Match! Phase Analysis Report

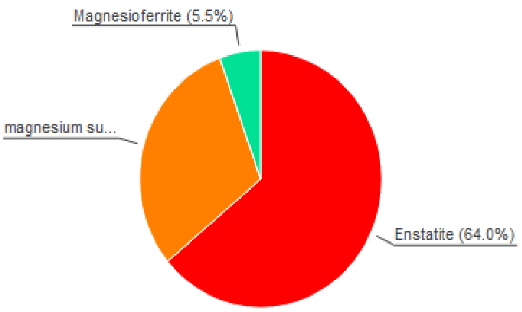
Sample: DVR-10 (5-70)

Sample Data

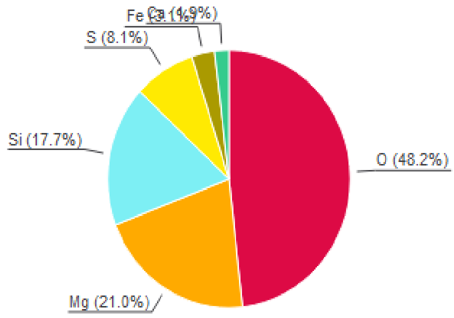
File name	DVR-10.RAW
File path	C:/Users/ASUS/Downloads
Data collected	Sep 7, 2023 22:40:35
Data range	5.000° - 70.000°
Original data range	5.000° - 70.000°
Number of points	3251
Step size	0.020
Rietveld refinement converged	No
Alpha2 subtracted	No
Background subtr.	No
Data smoothed	Yes
Radiation	X-rays
Wavelength	1.540600 Å

Analysis Results

Phase composition (Weight %)



Elemental composition (Weight %)



Index	***Amount (%)***	***Name***	***Formula sum***
A	64.0	Enstatite	Ca0.15 Mg1.85 O6 Si2
B	30.6	magnesium sulfate	Mg O4 S
C	5.5	Magnesioferrite	Fe2 Mg O4
	14.6	*Unidentified peak area*	

Amounts calculated by RIR (Reference Intensity Ratio) method

Element	***Amount (weight %)***
O	*48.2%(*)*
Mg	21.0%
Si	17.7%
S	8.1%
Fe	3.1%
Ca	1.9%
**LE (sum)*	*48.2%*

Details of identified phases

A: Enstatite (64.0 %)***

Formula sum	Ca0.15 Mg1.85 O6 Si2
Entry number	96-900-5543
Figure-of-Merit (FoM)	0.663880*
Total number of peaks	500
Peaks in range	170
Peaks matched	53
Intensity scale factor	0.34*
Space group	P 1 21/c 1
Crystal system	monoclinic
Unit cell	a= 9.6540 Å b= 8.8450 Å c= 5.2030 Å β= 108.370 °
I/Ic	0.89
Calc. density	3.200 g/cm³
Reference	Tribaudino M., Nestola F., "Average and local structure in P2_1/c clinopyroxenes along thejoin diopside-enstatite (CaMgSi2O6-Mg2Si2O6)Sample: Di15En85 (split model)", European Journal of Mineralogy **14**, 549-555 (2002)

B: magnesium sulfate (30.6 %)

Formula sum	Mg O4 S
Entry number	96-230-0131
Figure-of-Merit (FoM)	0.000000
Total number of peaks	338
Peaks in range	62
Peaks matched	15
Intensity scale factor	0.43
Space group	P b n m
Crystal system	orthorhombic
Unit cell	a= 4.7460 Å b= 8.5831 Å c= 6.7093 Å
I/Ic	2.30
Calc. density	2.925 g/cm³
Reference	Fortes A. D., Wood I. G., Vocadlo L., Brand H. E. A., Knight K. S., "Crystal structures and thermal expansion of \a-MgSO~4~ and \b-MgSO~4~from 4.2 to 300K by neutron powder diffraction", Journal of Applied Crystallography **40(4)**, 761-770 (2007)

C: Magnesioferrite (5.5 %)*

Formula sum	Fe2 Mg O4
Entry number	96-900-3776
Figure-of-Merit (FoM)	0.726972*
Total number of peaks	36
Peaks in range	11
Peaks matched	6
Intensity scale factor	0.15*
Space group	F d -3 m
Crystal system	cubic
Unit cell	a= 8.3359 Å
I/Ic	4.59
Calc. density	4.587 g/cm³
Reference	Antao S. M., Hassan I., Crichton W. A., Parise J. B., "Effects of high pressure and high temperature on cation ordering inmagnesioferrite, MgFe2O4, using in situ synchrotron X-ray powderdiffraction up to 1430 K and 6 GPaSample: T = 885 K, P = 6 GPa during heating", American Mineralogist **90**, 1500-1505 (2005)

(*) 2theta values have been shifted internally for the calculation of the amounts, the intensity scaling factors as well as the figure-of-merit (FoM), due to the active search-match option 'Automatic zero point adaption'.

Candidates

Name	***Formula***	***Entry No.***	***FoM***
	Mo3 O22.5 P6	96-430-3254	0.7424
	Mo3 O22.5 P6	96-711-1395	0.7424
Li2 (S O4)	O4 S	96-153-7067	0.7414
Li2 (S O4)	Li2 O4 S	96-153-0495	0.7397
	Mo2 O15 P4	96-430-3255	0.7375
	Mo3 O22.5 P6	96-430-3256	0.7367
Ag (Cl O4)	Ag Cl O4	96-810-3391	0.7250
Li.5 Fe1.25 V1.25 O4	Fe1.25 Li0.5 O4 V1.25	96-154-1498	0.7211
Li.5 Fe V1.5 O4	Fe Li0.5 O4 V1.5	96-154-1500	0.7205
Maghemite	Fe2 O3	96-900-6317	0.7188
(Cu0.2 Mn0.8) (Cu0.8 Mn1.2) O4	Cu Mn2 O4	96-152-6930	0.7167
Magnetite	Fe3 O4	96-900-5843	0.7163
Mn (Cr Co) O4	Co Cr Mn O4	96-210-6073	0.7158
Fe Co Cr O4	Co Cr Fe O4	96-153-7129	0.7153
Chromite	Al0.228 Cr1.7 Fe0.509 Mg0.547 Mn0.009 Ni0.002 O4 Ti0.004	96-901-3669	0.7151
Magnetite	Fe3 O4	96-900-5815	0.7148
(Cr0.95 Ga0.05) (Co Cr0.05 Ga0.95) O4	Co Cr Ga O4	96-153-3587	0.7146
Magnetite	Fe3 O4	96-901-6804	0.7144
Ni Fe1.95 Mn.05 O4	Fe1.95 Mn0.05 Ni O4	96-154-1590	0.7142
Cochromite	Co Cr2 O4	96-901-3148	0.7142
(Fe0.829 Mg0.171) (Fe1.586 Li0.414) O4	Fe2.415 Li0.414 Mg0.171 O4	96-152-6943	0.7140
Chromite	Al0.506 Cr1.188 Fe0.944 Mg0.299 Mn0.011 O4 Ti0.036 V0.014 Zn0.002	96-901-0822	0.7140
Iron diiron(III) oxide (Magnetite)	Fe3 O4	96-101-1033	0.7139
Ni Mn.2 Cr1.8 O4	Cr1.8 Mn0.2 Ni O4	96-152-6360	0.7138
Li.98 Zn.36 V1.66 O4	Li0.98 O4 V1.66 Zn0.36	96-152-6273	0.7136
Chromite	Al0.19 Cr1.75 Fe0.479 Mg0.567 Mn0.009 O4 Ti0.004	96-901-3665	0.7136
Cu (Mn O2)2	Cu Mn2 O4	96-154-1585	0.7135
(Co0.21 Fe0.09 Cr0.70) (Co0.79 Fe0.11 Cr0.30 Ga0.80) O4	Co Cr Fe0.2 Ga0.8 O4	96-153-3584	0.7133
Chromite	Al0.218 Cr1.72 Fe0.452 Mg0.589 Mn0.008 O4 Ti0.012	96-901-3667	0.7131
Magnetite	Fe3 O4	96-900-5842	0.7130
Magnetite	Fe3 O4	96-900-6248	0.7130
	Fe1.4 Ga1.6 O4	96-154-1526	0.7128
Chromite	Al0.492 Cr1.133 Fe0.78 Mg0.499 Ni0.007 O4 Si0.001 Ti0.082 Zn0.005	96-900-4940	0.7128
Li.5 Fe2 V.5 O4	Fe2 Li0.5 O4 V0.5	96-154-1496	0.7124
Chromite	Al0.488 Cr1.18 Fe0.951 Mg0.314 Mn0.01 Ni0.004 O4 Ti0.036 V0.014 Zn0.003	96-901-0821	0.7122
Chromite	Al0.219 Cr1.56 Fe0.597 Mg0.574 Mn0.009 Ni0.002 O4 Ti0.036	96-901-3670	0.7120

Chromite	Al0.246 Cr1.702 Fe0.431 Mg0.609 Mn0.008 Ni0.004 O4	96-901-3668	0.7119
	Cr2 Fe0.66 Mg0.34 O4	96-210-8532	0.7118
	Cr2 Fe0.65 Mg0.35 O4	96-210-8534	0.7118
	Cr2 Fe0.67 Mg0.33 O4	96-210-8535	0.7118
	Cr2 Fe0.66 Mg0.34 O4	96-210-8533	0.7117
Chromite	Al0.223 Cr1.722 Fe0.444 Mg0.601 Mn0.007 O4 Ti0.002	96-901-3666	0.7117
(Zn0.988 Mn0.012) (Mn1.326 Zn0.024 Ni0.65) O4	Mn1.338 Ni0.65 O4 Zn1.012	96-152-6212	0.7116
Magnesioferrite	Fe2 Mg O4	96-900-3776	0.7113
Mg.3125 Mn2.0625 Al.625 O4	Al0.625 Mg0.3125 Mn2.0625 O4	96-154-1438	0.7111
Magnesioferrite	Fe2 Mg O4	96-900-3780	0.7110
Magnesioferrite	Fe2 Mg O4	96-900-3782	0.7110
Li.35 Zn.3 Fe2.35 O4	Fe2.35 Li0.35 O4 Zn0.3	96-153-3487	0.7106
	Ga2 O4 Zn	96-400-1768	0.7106
Magnesioferrite	Fe2 Mg O4	96-900-3789	0.7105
Mg Mn1.75 Al.25 O4	Al0.25 Mg Mn1.75 O4	96-154-1440	0.7104
Zinc diiron(III) oxide	Fe2 O4 Zn	96-101-0131	0.7102
and 1136 others...			

Search-Match

Settings

Reference database used	COD-Inorg 2023.06.06
Automatic zeropoint adaptation	Yes
Downgrade entries with low scaling factors	Yes
Minimum figure-of-merit (FoM)	0.60
2theta window for peak corr.	0.30 deg.
Minimum rel. int. for peak corr.	0
Parameter/influence 2theta	0.50
Parameter/influence intensities	0.50
Parameter multiple/single phase(s)	0.50

Criteria for entries added by user

Reference:

Entry number:

96-100-0048;96-101-1019;96-154-5543;96-154-8550;96-154-8551;96-154-8552;96-156-6758;96-900-1179;96-900-1221;96-900-1594;96-900-1595;96-900-1596;96-900-1597;96-900-1598;96-900-1599;96-900-1600;96-900-1601;96-900-1602;96-900-1642;96-900-1643;96-900-1644;96-900-1645;96-900-1646;96-900-1700;96-900-1701;96-900-2711;96-900-2712;96-900-2713;96-900-2714;96-900-2715;96-900-2716;96-900-2717;96-900-4030;96-900-4031;96-900-4032;96-900-4033;96-900-4034;96-900-4118;96-900-4119;96-900-4957;96-900-4958;96-900-5542;96-900-5543;96-900-5544;96-900-5545;96-900-5589;96-900-5590;96-900-5776;96-900-5777;96-900-6338;96-900-6339;96-900-6340;96-900-6341;96-900-6342;96-900-6343;96-900-6428;96-900-6429;96-900-6430;96-900-6431;96-900-6432;96-900-6433;96-900-6434;96-900-6435;96-900-6436;96-900-6437;96-900-6438;96-900-6439;96-900-6440;96-900-6441;96-900-6442;96-900-6443;96-900-8078;96-900-8165;96-901-0242;96-901-0872;96-901-0873;96-901-0874;96-901-0888;96-901-0889;96-901-0890;96-901-0891;96-901-0892;96-901-0893;96-901-0894;96-901-0895;96-901-0896;96-901-0897;96-901-0898;96-901-0899;96-901-1582;96-901-3659;96-901-4118;96-901-4448;96-901-4536;96-901-4861;96-901-4978;96-901-4984;96-901-5810;96-901-6053;96-901-6154;96-901-6258;96-901-6266;96-901-6573;96-901-6943;96-901-6944;96-901-6945;96-901-6946;96-100-6064;96-101-1242;96-101-1246;96-900-1447;96-900-1448;96-900-1449;96-900-1450;96-900-1451;96-900-1452;96-900-1453;96-900-1454;96-900-1455;96-900-1456;96-900-1457;96-900-1458;96-900-1459;96-900-1460;96-900-1461;96-900-1462;96-900-1463;96-900-1464;96-900-1465;96-900-1466;96-900-1467;96-900-1468;96-900-1469;96-900-1470;96-900-1471;96-900-1472;96-900-1473;96-900-1474;96-900-1475;96-900-1476;96-900-1477;96-900-1478;96-900-1479;96-900-1480;96-900-1481;96-900-1482;96-900-1483;96-900-1484;96-900-1485;96-900-1486;96-900-1487;96-900-1488;96-900-1489;96-900-1490;96-900-3583;96-900-3584;96-900-3585;96-900-3586;96-900-3587;96-900-3588;96-900-3589;96-900-3590;96-900-3591;96-900-3592;96-900-3593;96-900-3594;96-900-3595;96-900-3596;96-900-3597;96-900-3598;96-900-3599;96-900-3600;96-900-3601;96-900-3602;96-900-3603;96-900-3604;96-900-3605;96-900-3606;96-900-3607;96-900-3608;96-900-3609;96-900-3610;96-900-3611;96-900-3612;96-900-3613;96-900-3614;96-900-3615;96-900-3616;96-900-3617;96-900-3618;96-900-3619;96-900-3620;96-900-3621;96-900-3622;96-900-3623;96-900-3624;96-900-3625;96-900-3626;96-900-3627;96-900-3774;96-900-3775;96-900-3776;96-900-3777;96-900-3778;96-900-3779;96-900-3780;96-900-3781;96-900-3782;96-900-3783;96-900-3784;96-900-3785;96-900-3786;96-900-3787;96-900-3788;96-900-3789;96-900-3790;96-900-3791;96-900-3792;96-900-3793;96-900-3794;96-900-3795;96-900-3796;96-900-3797;96-900-3798;96-900-3799;96-900-3800;96-900-3801;96-900-3802;96-900-3803;96-900-3804;96-900-3805;96-900-5518;96-900-7271;96-900-7272;96-900-7273;96-900-7274;96-100-0028;96-110-0072;96-110-0077;96-110-0081;96-110-0088;96-110-0089;96-110-0090;96-110-0091;96-110-0092;96-110-0093;96-110-0094;96-110-0095;96-110-0097;96-110-0098;96-110-0101;96-110-0102;96-110-0103;96-110-0104;96-120-0005;96-201-8908;96-221-4532;96-230-0129;96-230-0130;96-230-0131;96-230-0132;96-704-1429;96-900-7473;96-901-5318

Peak List

No.	2theta [°]	d [Å]	I/I0 (peak height)	Counts (peak area)	FWHM	Matched
1	18.38	4.8232	145.10	3.18	0.2128	C
2	19.46	4.5578	337.68	40.29	1.1600	A
3	20.24	4.3839	208.33	57.42	2.6800	A
4	21.90	4.0552	538.59	64.26	1.1600	A
5	22.28	3.9869	561.76	16.18	0.2800	A
6	23.16	3.8374	217.32	102.82	4.6000	B
7	25.20	3.5312	121.23	46.39	3.7200	A,B

8	26.54	3.3558	288.90	30.90	1.0400	A,B
9	28.04	3.1796	850.69	28.00	0.3200	A,B
10	29.88	2.9879	555.69	38.86	0.6800	A
11	30.40	2.9380	235.50	7.75	0.3200	A,C
12	31.04	2.8788	824.49	30.53	0.3600	A,B
13	35.12	2.5532	416.24	13.48	0.3149	A
14	35.82	2.5050	1000.00	23.54	0.2289	A,C
15	36.47	2.4615	427.66	30.49	0.6932	A,B
16	42.50	2.1253	288.52	16.54	0.5573	A
17	43.42	2.0824	182.52	5.71	0.3040	A,B,C
18	44.46	2.0361	207.37	9.21	0.4318	A,B
19	56.94	1.6159	374.73	13.22	0.3431	A,B
20	57.48	1.6020	307.40	12.11	0.3831	A,B,C
21	60.34	1.5327	122.49	6.32	0.5013	A
22	63.12	1.4717	350.45	20.26	0.5620	A,B,C
23	64.34	1.4468	114.46	4.50	0.3825	A,B
24	64.90	1.4356	119.60	4.15	0.3377	A,B
25	67.98	1.3779	228.06	14.11	0.6015	A

Integrated Profile Areas

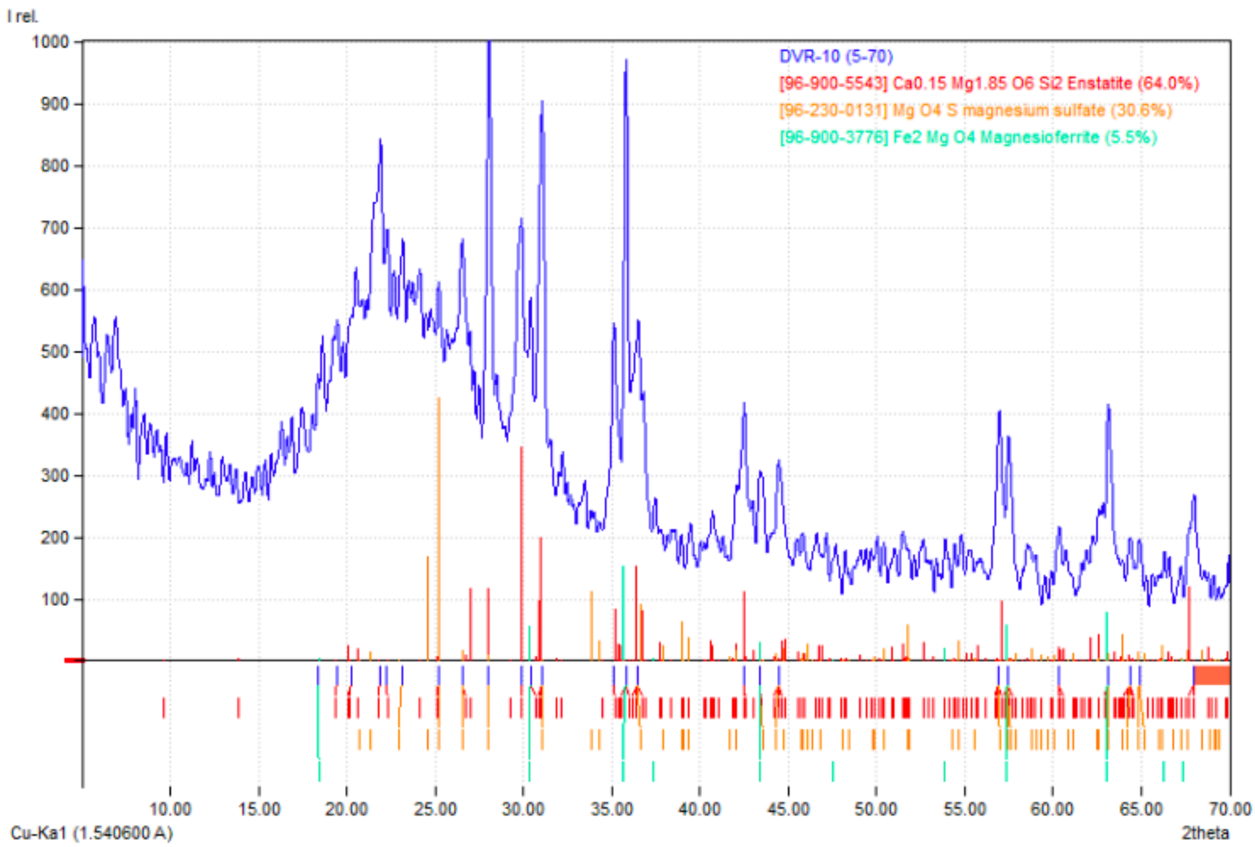
Based on calculated profile

Profile area	***Counts***	***Amount***
Overall diffraction profile	111794	100.00%
Background radiation	78888	70.57%
Diffraction peaks	32906	29.43%
Peak area belonging to selected phases	16559	14.81%
Peak area of phase A (Enstatite)	*10245*	*9.16%*
Peak area of phase B (magnesium sulfate)	*4672*	*4.18%*
Peak area of phase C (Magnesioferrite)	*1642*	*1.47%*
Unidentified peak area	16347	14.62%

Peak Residuals

Peak data	***Counts***	***Amount***
Overall peak intensity	640	100.00%
Peak intensity belonging to selected phases	72	11.18%
Unidentified peak intensity	569	88.82%

Diffraction Pattern Graphics



LAMPIRAN 5
HASIL ANALISIS X-RAY FLUORESCENCE (XRF)

PT. AISPEKTRA LABORATORY SERVICES
Office : Kompleks Komplek Puri Residence Blok D/7
Jl Tamalanrea Raya, Makassar 90245 Sulawesi Selatan
Telp/Fax. +62 4118994478 Email : info@aispektra.co.id

REPORT OF ANALYSIS
(Laporan Analisis)

Certificate Number/*Nomor Sertifikat*	000292023
Customer/*Pelanggan*	: SUFRIADIN
Subject / *Hal*	: Mineral Analysis
Description of Sample/ *Keterangan Sampel*	: Nickel Ore
Number of Sample (s) / *Jumlah Sampel*	: 4 (Four)
Form of Sample / *Bentuk Sampel*	: Press pellet
Test Required / *Analisa uji*	: Elemental (Fe,Co,Ni,Si,Mg,Al,Mn,Ca,Ti,Cr)
Date Received/ *Tanggal terima*	: 15/07/2023
Date of Analysis / *Tanggal Analisa*	: 18/07/2023
Method of Analysis/ *Metode analisa*	: XRF
Reference / *Referensi*	: -

RESULT

SAMPLE ID	Ni (%)	Fe (%)	Co (%)	SiO_2 (%)	MgO(%)	Al_2O_3 (%)	CaO (%)	MnO (%)	TiO (%)	Cr_2O_3 (%)
DV-SA	0.55	30.15	0.08	37.48	23.70	2.72	0.28	0.76	0.04	1.92

* Below detection limit

HASIL ANALISA TERSEBUT DIATAS HANYA MERUJUK PADA SAMPEL YANG DISERAHKAN DIMANA PENGAMBILAN SAMPEL TERSEBUT TIDAK DILAKUKAN OLEH AISPEKTRA LABORATORY

ANALIS

FARIN AHMAD, A.Ma