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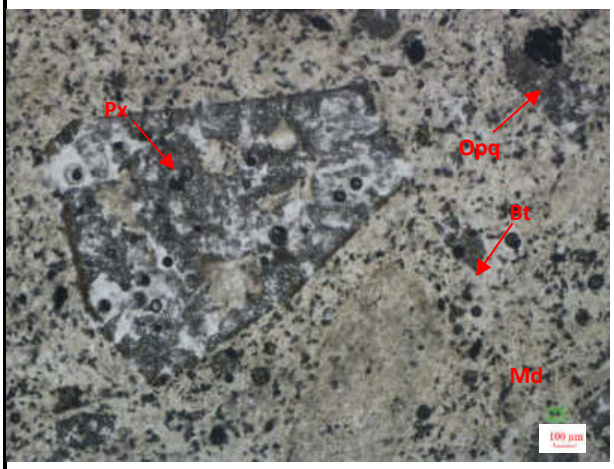
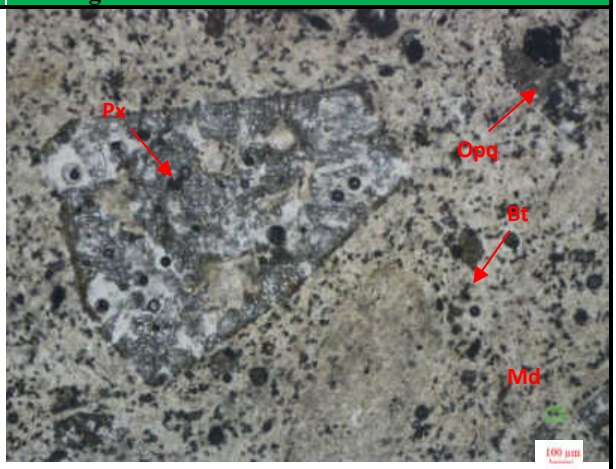
# LAMPIRAN

**Lampiran 1.** Deskripsi petrografi batuan vulkanik

| | |
|---|---|
| **Kode Sampel : 1B**<br>**Lokasi : Sinjai** | **Satuan : Basalt Porfiri**<br>**Litologi : Basalt Porfiri** |
|  |  |
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| | |
|---|---|
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi kuning kecoklatan, warna interferensi coklat kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas porfiri afanitik, bentuk mineral euhedral - anhedral. Relasi Inequigranular, Komposisi mineral terdiri dari mineral Piroksin, Biotit, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,05 m – 1 mm. |

**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Biotit (Bt)** | 20% | Warna Absorpsi Coklat, Bentuk subhedral - anhedral, Relief rendah, Pleokroisme Dwikroik, Ukuran 0,05 Mm. Warna Interferensi Coklat, Belahan Satu Arah, Indeks Bias Nmin>Ncb, Sudut Gelapan 20°, Jenis Gelapan Miring |
| **Piroksin (Px)** | 30% | Warna Absorpsi *Colourless*, Bentuk Euhedral - Subhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,1 - 1 Mm, Warna Interferensi Abu-abu kehitaman, Belahan Satu Arah, Indeks Bias Nmin>Ncb, Sudut Gelapan 23°, Jenis Gelapan Miring. Piroksen hadir sebagai fenokris. |
| **Mineral Opaq (Opq)** | 5% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Intensitas Rendah, Ukuran 0,02 – 0,5 Mm. |
| **Massa Dasar (Md)** | 45% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

| Kode Sampel : 2B<br>Lokasi : Sinjai | Satuan : Basalt Porfiri<br>Litologi : Basalt Porfiri |
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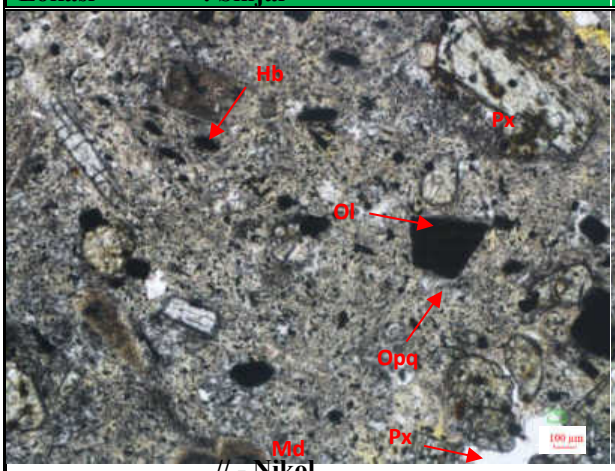


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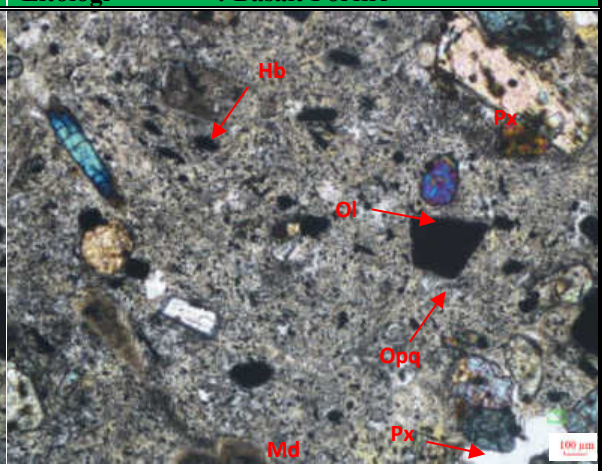


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|---|---|
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral Olivin, Hornblend, Piroksin, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,2 m – 0,7 mm |

**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Olivin (Ol)** | 15% | Warna absorpsi Transparan/*Colourless*, intensitas sedang dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin<Ncb. Pada warna interferensi berwarna biru keunguan, pleokroisme Dwikroik, dengan sudut gelapan 35°, jenis gelapan miring. Ukuran mineral 0,3 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Hornblend (Hb)** | 5% | Warna absorpsi coklat, intensitas rendah dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan bentuk mineral euhedral-subhedral, sudut gelapan 37°,jenis gelapan miring dengan ukuran mineral 0,5 cm. |
| **Piroksin (Px)** | 25% | Warna absorpsi Transparan/*Colourless*, intensitas tinggi dengan relief tinggi, pecahan *uneven* dengan belahan satu arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna biru kemerahan, pleokroisme monokroik, dengan sudut gelapan 51°, jenis gelapan paralel. Ukuran mineral 0,3-0,7 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Mineral Opaq (Opq)** | 15% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Intensitas Rendah, Ukuran 0,02 – 0,6 Mm. |
| **Dasar (Md)** | 40% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

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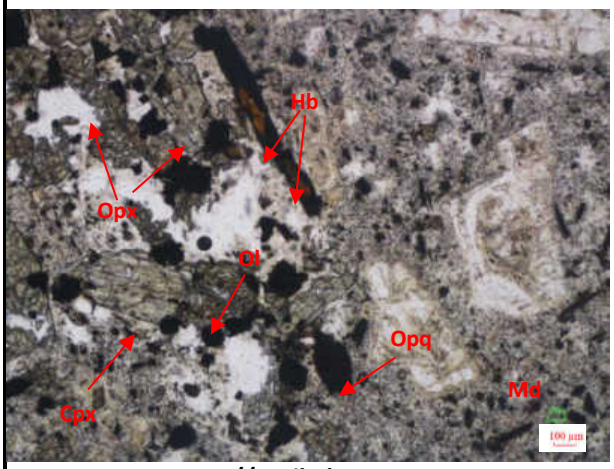
| **Kode Sampel : 3B**<br>**Lokasi : Sinjai** | **Satuan : Trakit Porfiri**<br>**Litologi : Basalt Porfiri** |

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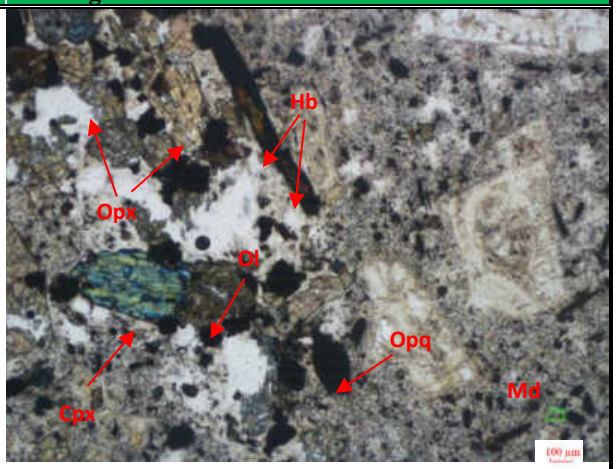


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|---|---|
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu-abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral *Orthopyroxene, Clinopyroxene,* Hornblend, Olivin, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,2 m – 0,8 mm. |

**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| ***Orthopyroxene* (Opx)** | 15% | Warna absorpsi Transparan/*Colourless* , intensitas tinggi dengan relief tinggi, pecahan *uneven* dengan belahan dua arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan sudut gelapan 40˚. Jenis gelapan miring, Ukuran mineral 0,5 mm dengan bentuk mineral euhedral sampai subhedral. |
| ***Clinopyroxene* (Cpx)** | 5% | Warna absorpsi Transparan/*Colourless* , intensitas tinggi dengan relief tinggi, pecahan *uneven* dengan belahan dua arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna hijau kebiruan, pleokroisme monokroik, dengan sudut gelapan 48˚. Jenis gelapan parallel, Ukuran mineral 0,3-0,7 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Olivin (Ol)** | 20% | Warna absorpsi Transparan/*Colourless* , intensitas sedang dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme Dwikroik, dengan sudut gelapan 40˚, jenis gelapan miring, Ukuran mineral 0,3-0,5 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Hornblend (Hb)** | 10% | Warna absorpsi coklat, intensitas sedang-tinggi dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna coklat kehitaman, pleokroisme monokroik, dengan bentuk mineral euhedral-subhedral, sudut gelapan 47˚, jenis gelapan miring, ukuran mineral 0,2-0,8 cm. |
| **l Opaq (Opq)** | 10% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Ukuran 0,02 – 0,4 Mm |
| **ı Dasar (Md)** | 40% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

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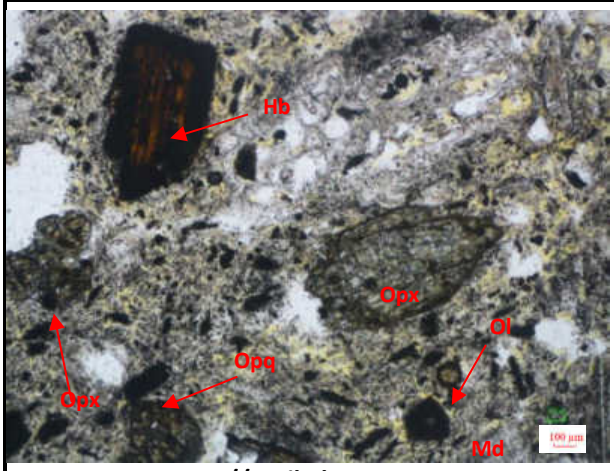
|---|---|
| **Kode Sampel : 4B**<br>**Lokasi : Sinjai** | **Satuan : Basalt Porfiri**<br>**Litologi : Basalt Porfiri** |

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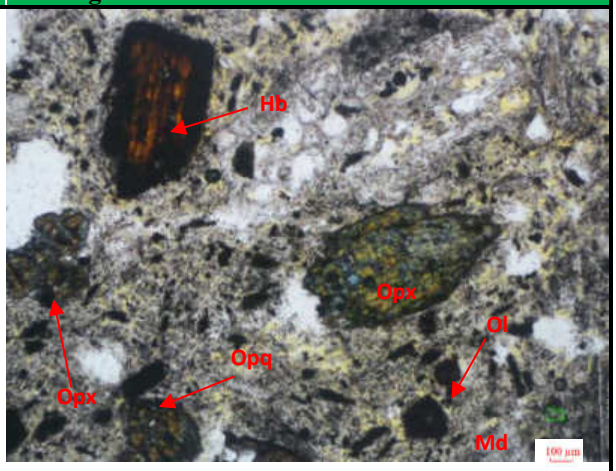


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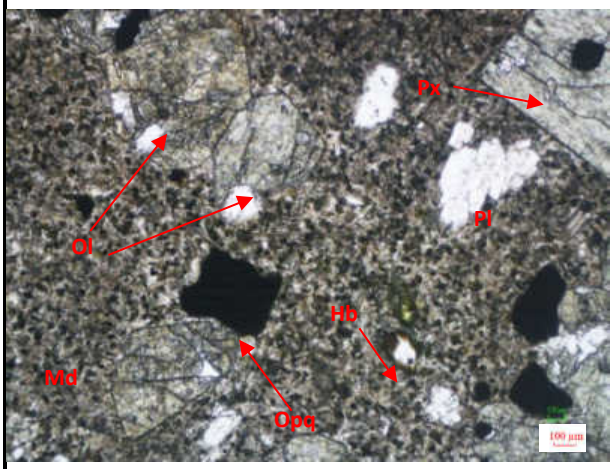
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Vesicle** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu-abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas Porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral Hornblend, *Orthopyroxene,* Olivin, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,2 m – 1,2 mm. |

**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Hornblend (Hb)** | 15% | Warna Absorpsi Coklat, Bentuk Euhedral - Subhedral, Relief Tinggi, Pleokroisme Monokroik, Ukuran 1,2 Mm. Warna Interferensi Coklat, Belahan Satu Arah, Indeks Bias Nmin>Ncb, Sudut Gelapan 20°, Jenis Gelapan Miring. |
| ***Orthopyroxene* (Opx)** | 30% | Warna Absorpsi Transparan/*Colourless*, Bentuk Subhedral-anhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,5 – 1 Mm. Warna Interferensi kuning kecoklatan, Pecahan *Uneven*, Belahan Satu Arah, Indeks Bias Nmin<Ncb, Sudut Gelapan 35°, Jenis Gelapan Miring |
| **Olivin (Ol)** | 5% | Warna Absorpsi Transparan/*Colourless* , Bentuk Subhedral-anhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,3 Mm. Warna Interferensi biru keunguan, Pecahan *Uneven,* Indeks Bias Nmin>Ncb, Sudut Gelapan 39°, Jenis Gelapan Miring |
| **Mineral Opaq (Opq)** | 20% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Ukuran 0,02 – 0,5 Mm |
| **ıssa Dasar** | 30% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

| | |
|---|---|
| **Kode Sampel : 6B**<br>**Lokasi : Maros** | **Satuan : Basalt Porfiri**<br>**Litologi : Basalt Porfiri** |

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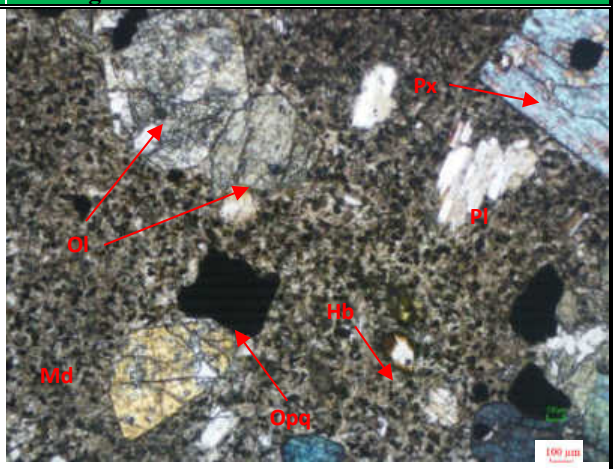


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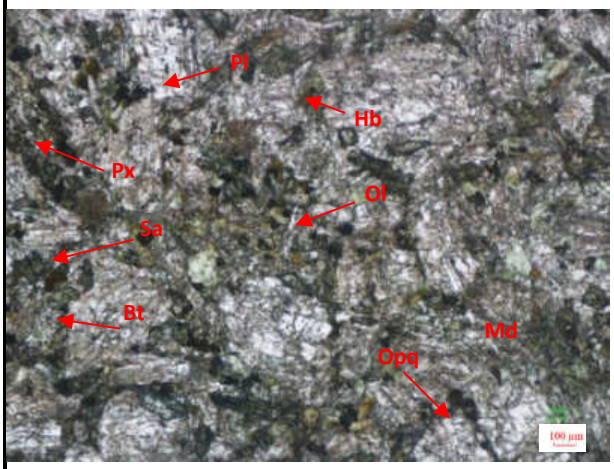
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu-abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas Porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral Olivin, Piroksen, Hornblend, Plagioklas, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,2 m – 1,5 mm. |

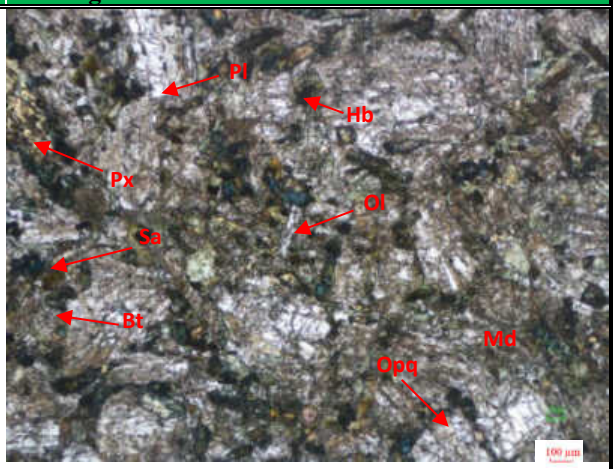
**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Olivin (Ol)** | 20% | Warna Absorpsi Transparan/*Colourless*, Bentuk Euhedral-subhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,8 Mm. Warna Interferensi abu-abu kehitaman, Pecahan *Uneven,* Indeks Bias Nmin>Ncb, Sudut Gelapan 29°, Jenis Gelapan Miring |
| **Piroksen (Px)** | 15% | Warna absorpsi Transparan/*Colourless* , intensitas rendah sampai sedang dengan relief tinggi, pecahan *uneven* dengan belahan dua arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna biru, pleokroisme monokroik, dengan sudut gelapan 35°, jenis gelapan miring. Ukuran mineral 0,7-1,5 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Hornblend (Hb)** | 5% | Warna absorpsi coklat, intensitas sedang dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan bentuk mineral euhedral-subhedral, sudut gelapan miring 25˚, jenis gelapan miring, ukuran mineral 0,3 cm. |
| **Plagioklas (Plg)** | 5% | Warna Absorpsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Subhedral - anhedral, Relief rendah, Pleokroisme monokroik, Ukuran 0,2-0,5 Mm, Belahan satu arah, Indeks Bias Nmin<Ncb, Kembaran Albit, Sudut Gelapan 32˚ Jenis Gelapan Miring Sehingga Jenis Plagioklas adalah Mineral Labradorite. |
| **Mineral Opaq (Opq)** | 10% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Ukuran 0,2-0,6 Mm |
| **ı Dasar (Md)** | 45% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kecoklatan, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

| Kode Sampel : $7B_1$ | Satuan : Basalt Porfiri |
|---|---|
| Lokasi : Maros | Litologi : Basalt Porfiri |




// - Nikol




X - Nikol

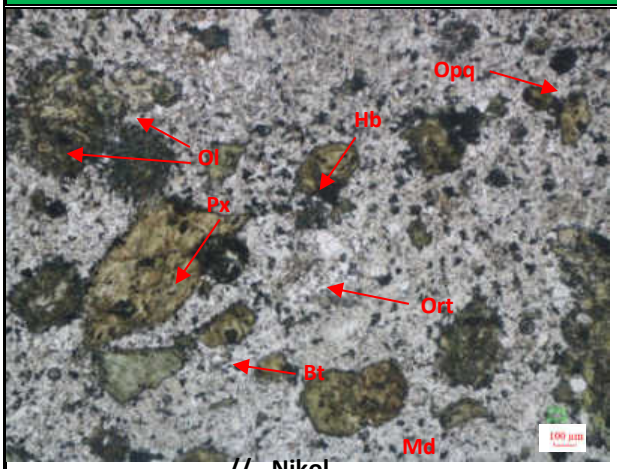
| | |
|---|---|
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu-abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas Porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral Olivin, Piroksen, Hornblend, Biotit, Sanidin, Plagioklas, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,1 m – 0,7 mm. |

**Deskripsi Mineral**

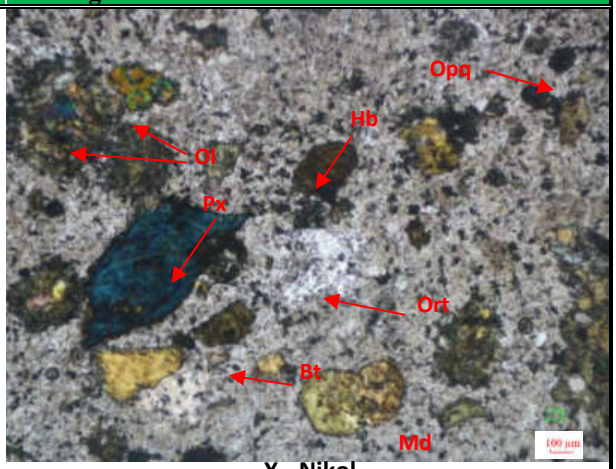
| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Olivin (Ol)** | 15% | Warna Absorpsi Transparan/*Colourless*, Bentuk Subhedral-Anhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,3 Mm. Warna Interferensi biru, Pecahan *Uneven,* Indeks Bias Nmin>Ncb, Sudut Gelapan 23°, Jenis Gelapan Miring |
| **Piroksen (Px)** | 5% | Warna absorpsi Transparan/*Colourless* , intensitas rendah sampai sedang dengan relief tinggi, pecahan *uneven* dengan belahan satu arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna abu-abu kecoklatan, pleokroisme monokroik, dengan sudut gelapan 35º, jenis gelapan miring. Ukuran mineral 0,3-0,5 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Hornblend (Hb)** | 10% | Warna absorpsi coklat, intensitas sedang dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan bentuk mineral subhedral-anhedral, sudut gelapan miring 25˚, jenis gelapan miring, ukuran mineral 0,2 cm. |
| **Biotit (Bt)** | 20% | Warna absorpsi coklat, intensitas sedang dengan relief rendah, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan bentuk mineral subhedral-anhedral, sudut gelapan miring 28˚, jenis gelapan miring, ukuran mineral 0,15 cm. |
| **Sanidin (Sa)** | 5% | Warna Absorpsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Subhedral - anhedral, Relief rendah, Pleokroisme monokroik, Ukuran 0,2-0,5 Mm, Belahan satu arah, Indeks Bias Nmin<Ncb, Kembaran Carlsbad, Sudut Gelapan 21˚ Jenis Gelapan Miring |
| **ioklas (Plg)** | 5% | Warna Absorpsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Subhedral - anhedral, Relief rendah, Pleokroisme monokroik, Ukuran 0,2-0,7 Mm, Belahan satu arah, Indeks Bias |

| | | |
|---|---|---|
| | | Nmin<Ncb, Kembaran Albit, Sudut Gelapan 38° Jenis Gelapan Miring Sehingga Jenis Plagioklas adalah Mineral Labradorite. |
| **Mineral Opaq (Opq)** | 25% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Ukuran 0,1-0,3 Mm |
| **Massa Dasar (Md)** | 15% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kecoklatan, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

| Kode Sampel : $7B_2$ | Satuan : Basalt Porfiri |
|---|---|
| Lokasi : Maros | Litologi : Basalt Porfiri |




// - Nikol




X - Nikol

| | |
|---|---|
| **Tipe Batuan** | **Batuan Beku** |
| **Tipe Struktur** | **Masif** |
| **Klasifikasi** | **Travis (1955)** |
| **Kenampakan Mikroskopis** | Warna absorbsi abu-abu kecoklatan, warna interferensi abu-abu kehitaman. Tekstur terdiri dari kristanilitas hipokristalin, granularitas Porfiro afanitik, bentuk mineral euhedral – anhedral, relasi inequigranular. Komposisi mineral terdiri dari mineral Olivin, Piroksen, Hornblend, Biotit, Ortoklas, Mineral Opaq, dan Massa Dasar. Ukuran mineral 0,2 m – 0,7 mm. |

**Deskripsi Mineral**

| Komposisi Mineral | (%) | Keterangan Optik Mineral |
|---|---|---|
| **Olivin (Ol)** | 10% | Warna Absorpsi Transparan/*Colourless*, Bentuk Subhedral-Anhedral, Relief Tinggi, Pleokroisme Dwikroik, Ukuran 0,3-0,5 Mm. Warna Interferensi biru keunguan, Pecahan *Uneven,* Indeks Bias Nmin>Ncb, Sudut Gelapan 33°, Jenis Gelapan Miring |
| **Piroksen (Px)** | 20% | Warna absorpsi Transparan/*Colourless* , intensitas rendah sampai sedang dengan relief tinggi, pecahan *uneven* dengan belahan satu arah, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna biru, pleokroisme monokroik, dengan sudut gelapan 37°, jenis gelapan miring. Ukuran mineral 0,3-0,7 mm dengan bentuk mineral euhedral sampai subhedral. |
| **Hornblend (Hb)** | 15% | Warna absorpsi coklat, intensitas sedang dengan relief tinggi, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna coklat kehitaman, pleokroisme monokroik, dengan bentuk mineral subhedral-anhedral, sudut gelapan miring 19°, jenis gelapan miring, ukuran mineral 0,2-0,4 cm. |
| **Biotit (Bt)** | 5% | Warna absorpsi coklat, intensitas sedang dengan relief rendah, pecahan *uneven*, Indeks bias Nmin < Ncb. Pada warna interferensi berwarna kuning kecoklatan, pleokroisme monokroik, dengan bentuk mineral subhedral-anhedral, sudut gelapan miring 24°, jenis gelapan miring, ukuran mineral 0,2 cm. |
| **Ortoklas (Ort)** | 5% | Warna Absorpsi Transparan/*Colourless*, Warna Interferensi abu-abu kehitaman, Bentuk Subhedral - anhedral, Relief rendah, pecahan *uneven* Pleokroisme monokroik, Ukuran 0,2-0,4 Mm, Indeks Bias Nmin<Ncb, Kembaran Carlsbad, Sudut Gelapan 21° Jenis Gelapan Miring |
| **ıl Opaq (Opq)** | 10% | Mineral Opaq Memiliki Warna Absorbsi Hitam, Warna Interferensi Hitam. Memiliki Relief Tinggi, Bentuk Anhedral, Ukuran 0,1-0,2 Mm |
| **ı Dasar (Md)** | 35% | Massa Dasar Terdiri Dari mikrokristalin. Massa Dasar Gelas Memiliki Warna Absorbsi Transparan/*Colourless*, Warna Interferensi abu-abu kecoklatan, Bentuk Anhedral, Ukuran Mineral < 0,02 Mm. |
| **Nama Batuan** | | **Basalt Porfiri (Travis, 1955)** |

**Lampiran 2.** Deskripsi profil *soil*

**Tabel 1.** Deskripsi profil stasiun pengamatan 1

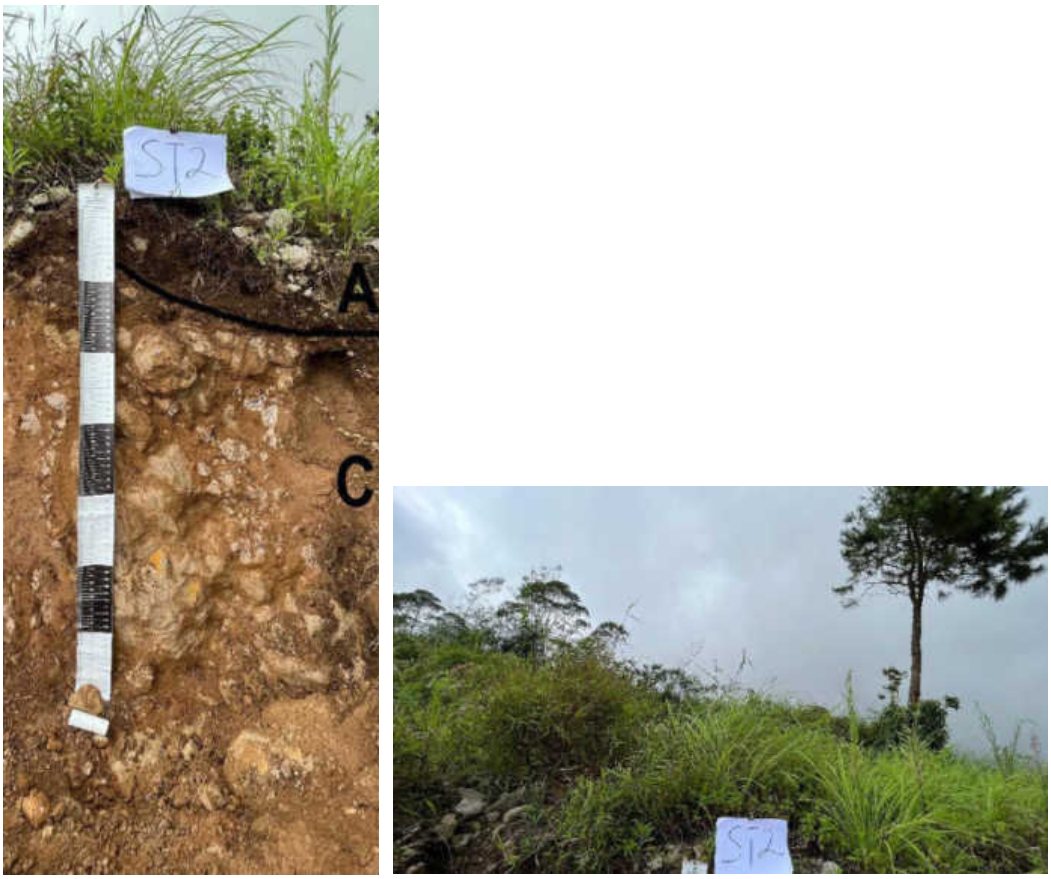
| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 1 |
| Tanggal pengamatan | 27 Mei 2023 |
| Koordinat | 5°17'4" LS dan 119°59'23" BT |
| Desa | Barania, Sinjai Barat |
| Altitude | 1370 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, semak dan rumput |
| Kedalaman *soil* | 93 cm |
| Horizon A (0-19 cm) | Tekstur liat berdebu |
| Horizon Bw (19-52 cm) | Tekstur liat |
| Horizon B (52-93 cm) | Tekstur liat berdebu |


(a) (b)

**Gambar 1.** Penampang profil *soil* (a) dan bentang lahan (b) ST 1

**Tabel 2.** Deskripsi profil stasiun pengamatan 2

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 2 |
| Tanggal pengamatan | 27 Mei 2023 |
| Koordinat | 5°17'8" LS dan 119°58'50" BT |
| Desa | Gunung Perak, Sinjai Barat |
| Altitude | 1520 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, semak dan rumput |
| Kedalaman *soil* | 14 cm |
| Horizon A (0-14 cm) | Tekstur liat |




(a) (b)

**Gambar 2.** Penampang profil *soil* (a) dan bentang lahan (b) ST 2

**Tabel 3.** Deskripsi profil stasiun pengamatan 3

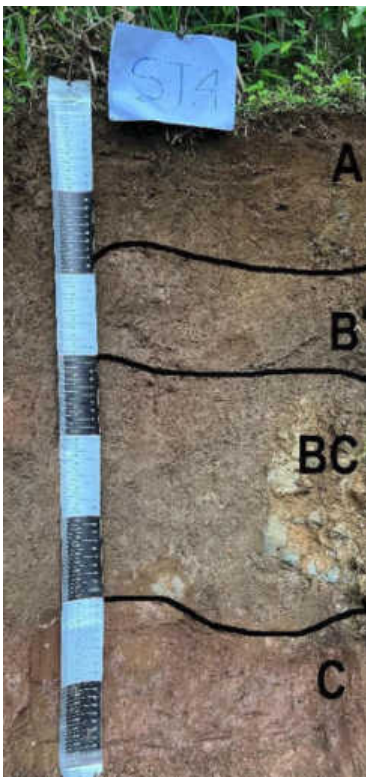
| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 3 |
| Tanggal pengamatan | 27 Mei 2023 |
| Koordinat | 5°17'25" LS dan 119°58'25" BT |
| Desa | Gunung Perak, Sinjai Barat |
| Altitude | 1610 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, semak dan rumput |
| Kedalaman *soil* | 30 cm |
| Horizon A (0-30 cm) | Tekstur lempung liat berdebu |


(a) (b)

**Gambar 3.** Penampang profil *soil* (a) dan bentang lahan (b) ST 3

**Tabel 4.** Deskripsi profil stasiun pengamatan 4

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 4 |
| Tanggal pengamatan | 28 Mei 2023 |
| Koordinat | 5°15’51” LS dan 119°58’53” BT |
| Desa | Gunung Perak, Sinjai Barat |
| Altitude | 1230 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, semak dan rumput |
| Kedalaman *soil* | 120 cm |
| Horizon A (0-36 cm) | Tekstur liat berdebu |
| Horizon B (36-60 cm) | Tekstur liat berdebu |
| Horizon BC (60-120 cm) | Tekstur liat berdebu |




(a) (b)

**Gambar 4.** Penampang profil *soil* (a) dan bentang lahan (b) ST 4

**Tabel 5.** Deskripsi profil stasiun pengamatan 5

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 5 |
| Tanggal pengamatan | 28 Mei 2023 |
| Koordinat | 5°16'38" LS dan 119°58'33" BT |
| Desa | Gunung Perak, Sinjai Barat |
| Altitude | 1430 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, semak dan rumput |
| Kedalaman *soil* | 20 cm |
| Horizon A (0-20 cm) | Tekstur lempung liat berdebu |


(a) (b)

**Gambar 5.** Penampang profil *soil* (a) dan bentang lahan (b) ST 5

**Tabel 6.** Deskripsi profil stasiun pengamatan 6

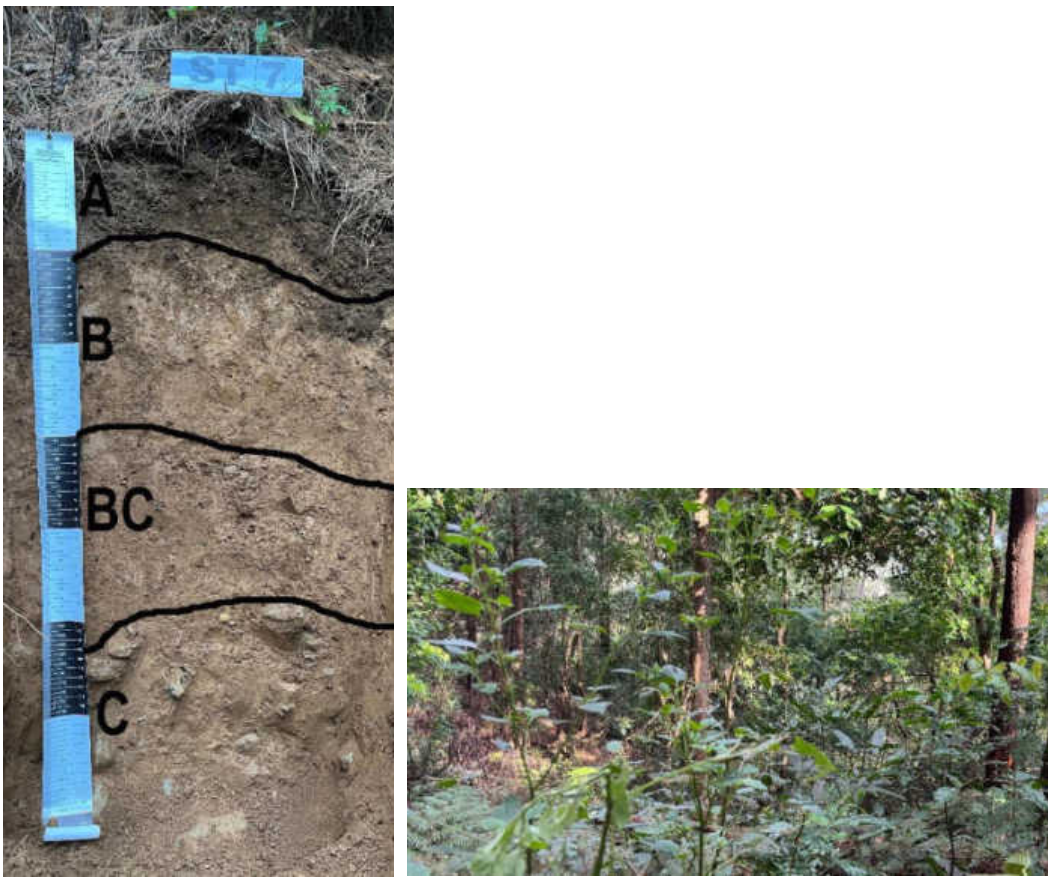
| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 6 |
| Tanggal pengamatan | 22 Juli 2023 |
| Koordinat | 5°08'27" LS dan 119°48'09" BT |
| Desa | Bonto Somba, Tompobulu |
| Altitude | 538 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | |
| Kedalaman *soil* | 105 cm |
| Horizon A (0-13 cm) | Tekstur lempung |
| Horizon Bt (13-105 cm) | Tekstur lempung liat |


(a) (b)

**Gambar 6.** Penampang profil *soil* (a) dan bentang lahan (b) ST 6

**Tabel 7.** Deskripsi profil stasiun pengamatan 7

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 7 |
| Tanggal pengamatan | 22 Juli 2023 |
| Koordinat | 5°09'32.3" LS dan 119°48'57.9" BT |
| Desa | Bonto Somba, Tompobulu |
| Altitude | 565 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Pohon pinus, pakis dan semak |
| Kedalaman *soil* | 106 cm |
| Horizon A (0-22 cm) | Tekstur lempung |
| Horizon B (22-60 cm) | Tekstur lempung berdebu |
| Horizon BC (60-106 cm) | Tekstur lempung liat |




(a) (b)

**Gambar 7.** Penampang profil *soil* (a) dan bentang lahan (b) ST 7

**Tabel 8.** Deskripsi profil stasiun pengamatan 8

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 8 |
| Tanggal pengamatan | 22 Juli 2023 |
| Koordinat | 5°09'12.4" LS dan 119°48'31.3" BT |
| Desa | Bonto Somba, Tompobulu |
| Altitude | 503 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | |
| Kedalaman *soil* | 52 cm |
| Horizon A (0-19 cm) | Tekstur lempung |
| Horizon B (19-52 cm) | Tekstur lempung berdebu |


(a) (b)

**Gambar 8.** Penampang profil *soil* (a) dan bentang lahan (b) ST 8

**Tabel 9.** Deskripsi profil stasiun pengamatan 9

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 9 |
| Tanggal pengamatan | 23 Juli 2023 |
| Koordinat | 5°08'33.2" LS dan 119°46'49" BT |
| Desa | Bonto Somba, Tompobulu |
| Altitude | 533 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | |
| Kedalaman *soil* | 34 cm |
| Horizon A (0-14 cm) | Tekstur lempung |
| Horizon Bw (14-34 cm) | Tekstur lempung |


(a) (b)

**Gambar 9.** Penampang profil *soil* (a) dan bentang lahan (b) ST 9

**Tabel 10.** Deskripsi profil stasiun pengamatan 10

| Keterangan | Deskripsi |
|---|---|
| Kode profil | ST 10 |
| Tanggal pengamatan | 23 Juli 2023 |
| Koordinat | 5°08'41.1" LS dan 119°46'19.9" BT |
| Desa | Bonto Somba, Tompobulu |
| Altitude | 452 mdpl |
| Penggunaan lahan | Hutan sekunder |
| Vegetasi | Semak, rumput, pinus |
| Kedalaman *soil* | 10 cm |
| Horizon A (0-10 cm) | Tekstur lempung |


(a) (b)

**Gambar 10.** Penampang profil *soil* (a) dan bentang lahan (b) ST 10

**Lampiran 3.** Hasil analisis karakteristik sifat fisik *soil* lokasi penelitian

| Fomasi Batuan | Profil | Horizon | Kedalaman | Tekstur | | | Kelas tekstur |
|---|---|---|---|---|---|---|---|
| | | | | Pasir | Debu | Liat | |
| | | | cm | ---------- % ---------- | | | |
| Batuan Gunungapi Lompobattang | ST 1 | A | 0-19 | 6 | 42 | 52 | Liat berdebu |
| | | Bw | 19-52 | 5 | 39 | 56 | Liat |
| | | B | 52-93 | 7 | 40 | 53 | Liat berdebu |
| | ST 2 | A | 0-14 | 9 | 38 | 53 | Liat |
| | ST 3 | A | 0-30 | 17 | 46 | 37 | Lempung liat berdebu |
| | ST 4 | A | 0-36 | 6 | 52 | 42 | Liat berdebu |
| | | B | 36-60 | 8 | 49 | 43 | Liat berdebu |
| | | BC | 60-120 | 12 | 45 | 43 | Liat berdebu |
| | ST 5 | A | 0-20 | 10 | 51 | 39 | Lempung liat berdebu |
| Batuan Gunungapi Baturape Cindakko | ST 6 | A | 0-13 | 42 | 42 | 16 | Lempung |
| | | Bt | 13-105 | 23 | 41 | 36 | Lempung liat |
| | ST 7 | A | 0-22 | 39 | 36 | 25 | Lempung |
| | | B | 22-60 | 29 | 50 | 21 | Lempung berdebu |
| | | BC | 60-106 | 32 | 37 | 31 | Lempung liat |
| | ST 8 | A | 0-19 | 38 | 42 | 20 | Lempung |
| | | B | 19-52 | 23 | 53 | 24 | Lempung Berdebu |
| | ST 9 | A | 0-14 | 26 | 47 | 26 | Lempung |
| | | Bw | 14-34 | 39 | 45 | 16 | Lempung |
| | ST 10 | A | 0-10 | 39 | 43 | 18 | Lempung |

**Lampiran 4.** Hasil analisis karakteristik sifat kimia *soil* lokasi penelitian

| Formasi Batuan | Profil | Horizon | Kedalaman | C-Organik | Basa-basa tukar | | | | Jumlah |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Ca | Mg | K | Na | |
| | | | cm | % | --------cmol $kg^{-1}$-------- | | | | |
| Batuan Gunungapi Lompobattang | ST 1 | A | 0-19 | 1,35 | 5,15 | 0,95 | 0,25 | 0,27 | 6,62 |
| | | AB | 20-51 | 1,04 | 3,25 | 1,02 | 0,16 | 0,22 | 4,65 |
| | | B | 52-95 | 0,65 | 1,95 | 0,85 | 0,11 | 0,19 | 3,1 |
| | ST 2 | A | 0-14 | 2,12 | 8,25 | 1 | 0,41 | 0,32 | 9,98 |
| | ST 3 | A | 0-30 | 1,33 | 5,45 | 1,74 | 0,38 | 0,3 | 7,87 |
| | ST 4 | A | 0-32 | 1,25 | 3,25 | 2,01 | 0,35 | 0,25 | 5,86 |
| | | B1 | 33-60 | 0,82 | 2,95 | 1,65 | 0,25 | 0,11 | 4,96 |
| | | B2 | 61-119 | 1,02 | 1,25 | 0,73 | 0,19 | 0,11 | 2,28 |
| | ST 5 | A | 0-36 | 2,81 | 8,05 | 0,85 | 0,25 | 0,41 | 9,56 |
| Batuan Gunungapi Baturape Cindakko | ST 6 | A | 0-13 | 2,67 | 2,64 | 3,24 | 0,38 | 0,53 | 6,79 |
| | | B1 | 13-73 | 0,65 | 1,46 | 1,31 | 0,43 | 0,43 | 3,63 |
| | ST 7 | A | 0-22 | 2,37 | 1,41 | 1,5 | 0,68 | 0,62 | 4,21 |
| | | B1 | 22-66 | 0,7 | 0,32 | 0,18 | 0,25 | 0,47 | 1,22 |
| | | B2 | 66-142 | 0,49 | 0,73 | 0,5 | 0,29 | 0,36 | 1,88 |
| | ST 8 | A | 0-19 | 1,05 | 2,17 | 3,95 | 0,31 | 0,51 | 6,94 |
| | | AB | 19-52 | 0,3 | 0,5 | 0,42 | 0,24 | 0,42 | 1,58 |
| | ST 9 | A | 0-20 | 1,92 | 5,65 | 6,85 | 0,98 | 0,41 | 64,74 |
| | | B | 20-66 | 1,19 | 4,95 | 5,8 | 0,89 | 0,43 | 56,37 |
| | ST 10 | A | 0-10 | 2,65 | 1,99 | 1,43 | 0,56 | 0,53 | 4,51 |

**Lampiran 5.** Kriteria penilaian hasil analisis kimia *soil*

| Sifat Tanah | Sangat Rendah | Rendah | Sedang | Tinggi | Sangat Tinggi |
|---|---|---|---|---|---|
| Karbon (%) | < 1,00 | 1,00-2,00 | 2,01-3,00 | 3,01-5,00 | >5,00 |
| Nitrogen(%) | < 0,10 | 0,10-0,20 | 0,21-0,50 | 0,51-0,75 | >0,75 |
| C/N | <5,0 | 5,0-7,9 | 8,0-12,0 | 12,1-17,0 | >17 |
| $P_2O_5$ eks- HCl (%) | <0,021 | 0,021-0,039 | 0,040-0,060 | 0,061-0,100 | >0,100 |
| P-avl Bray-II (ppm) | <8,0 | 8,0-15 | 16-25 | 26-35 | >35 |
| P-avl Olsen (ppm) | <10 | 10-25 | 26-45 | 46-60 | >60 |
| $K_2O$ eks-HCl (mg/100 ) | <0,03 | 0,03-0,06 | 0,07-0,11 | 0,12-0,20 | >0,20 |
| KTK/CEC (me/100 ) | <5 | 10-16 | 17-24 | 25-40 | >40 |
| Susunan Kation | | | | | |
| K-tukar ( me/ 100 ) | <0,1 | 0,1-0,2 | 0,3-0,5 | 0,6-1,0 | >1,0 |
| Na-tukar (me/ 100) | <0,1 | 0,1-0,3 | 0,4-0,7 | 0,8-1,0 | >1,0 |
| Mg-tukar (me/ 100) | <0,4 | 0,4-1,0 | 1,1-2,0 | 2,1-8,0 | >8,0 |
| Ca-tukar (me/ 100) | <2,0 | 2-5 | 6-10 | 11-20 | >20 |
| Kejenuhan Basa (%) | <20 | 20-35 | 36-50 | 51-70 | >70 |
| Kejenuhan Al (%) | <10 | 10-20 | 21-30 | 31-60 | >60 |

| | Sangat Masam | Masam | Agak Masam | Netral | Agak Alkalis | Alkalis |
|---|---|---|---|---|---|---|
| pH ($H_2O$) | <4,5 | 4,5-5,5 | 5,6-6,5 | 6,6-7,5 | 7,6-8,5 | >8,5 |
| pH (KCl) | <2,5 | 2,5-4,0 | ----- | 4,1-6,0 | 6,1-6,5 | >6,5 |

*Sumber : Hardjowigeno, S. 1995. Ilmu Tanah*

# Match! Phase Analysis Report

## Sample: ST-1-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-1-L1.RAW |
| File path | D:/S2 Geologi/data hasil/17 sampel/ST-1-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 5.040° - 70.040° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.04° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 34.0 | Olivine | Mg2 O4 Si |
| B | 24.4 | Potassium aluminium silicate hydroxide * Muscovite 2M1 | Al3 H K O12 Si3 |
| C | 24.3 | Vermiculite | H2 Mg3 O12 Si4 |
| D | 9.7 | Bytownite | Al7.76 Ca3.44 Na0.56 O32 Si8.24 |
| E | 3.3 | Hornblende | Al2.42 Ca1.802 Fe1.846 H2 Mg2.224 Na0.628 O24 Si6.44 Ti0.07 |
| F | 2.7 | Anorthite | Al Ca O4 Si |
| G | 1.6 | Quartz | O2 Si |
| H | 0.0 | Montmorillonite | Al2 Ca O12 Si4 |
| | *1.1* | *Unidentified peak area* | |

***A: Olivine (34.0 %)***

| | |
|---|---|
| Formula sum | Mg2 O4 Si |
| Entry number | 96-900-6399 |
| Figure-of-Merit (FoM) | 0.662490 |
| Total number of peaks | 168 |
| Peaks in range | 168 |
| Peaks matched | 39 |
| Intensity scale factor | 0.58 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit cell | a= 4.7536 Å b= 10.2066 Å c= 5.9845 Å |
| I/Icor | 0.83 |
| Calc. density | 3.217 g/cm³ |
| Reference | Muller-Sommer M, Hock R., Kirfel A., "Rietveld refinement study of the cation distribution in (Co, Mg)-olivine solid solution Sample: MR100", Physics and Chemistry of Minerals **24**, 17-23 (1997) |

***B: Potassium aluminium silicate hydroxide * Muscovite 2M1 (24.4 %)***

| | |
|---|---|
| Formula sum | Al3 H K O12 Si3 |
| Entry number | 96-110-0014 |
| Figure-of-Merit (FoM) | 0.775981 |
| Total number of peaks | 299 |
| Peaks in range | 299 |
| Peaks matched | 111 |
| Intensity scale factor | 1.61 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1800 Å b= 9.0200 Å c= 20.0400 Å β= 95.500 ° |
| I/Icor | 3.19 |
| Meas. density | 2.798 g/cm³ |
| Calc. density | 2.830 g/cm³ |
| Reference | Jackson W W, West J, "", Zeitschrift fuer Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie (-144,1977) **76**, 211-227 (1931) |

***C: Vermiculite (24.3 %)***

| | |
|---|---|
| Formula sum | H2 Mg3 O12 Si4 |
| Entry number | 96-900-0017 |
| Figure-of-Merit (FoM) | 0.727104 |
| Total number of peaks | 263 |
| Peaks | 2 |
| Peaks | 2 |
| Intensi | .78 |
| Space | l c 1 |
| Crysta | noclinic |
| Unit ce | 5.3300 Å b= 9.1800 Å c= 28.8500 Å β= 93.250 ° |
| I/Icor | .53 |
| Calc. d | '86 g/cm³ |
| Refere | ndricks S. B., Jefferson M. E., "Crystal structure of vermiculites and mixed vermiculite-chlorites", American Mineralogist **23**, 1-862 (1938) |



***D: Bytownite (9.7 %)***

| | |
|---|---|
| Formula sum | Al7.76 Ca3.44 Na0.56 O32 Si8.24 |
| Entry number | 96-901-1202 |
| Figure-of-Merit (FoM) | 0.685021 |

| | |
|---|---|
| Figure-of-Merit (FoM) | 0.685031 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 219 |
| Intensity scale factor | 0.14 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1830 Å b= 12.8830 Å c= 14.1860 Å α= 93.380° β= 115.870 ° γ= 90.820 ° |
| I/Icor | 0.60 |
| Calc. density | 2.729 g/cm³ |
| Reference | Facchinelli A., Bruno E., Chiari G., "The structure of bytownite quenched from 1723 K Locality: satellite dyke, Traversella stock, Sesia Lanzo zone, Western Alps, Italy Sample: BytQ, P-1 model", Acta Crystallographica, Section B **35(1)**, 34-42 (1979) |

***E: Hornblende (3.3 %)***

| | |
|---|---|
| Formula sum | Al2.42 Ca1.802 Fe1.846 H2 Mg2.224 Na0.628 O24 Si6.44 Ti0.07 |
| Entry number | 96-900-1226 |
| Figure-of-Merit (FoM) | 0.716829 |
| Total number of peaks | 299 |
| Peaks in range | 299 |
| Peaks matched | 119 |
| Intensity scale factor | 0.07 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 9.8130 Å b= 18.0550 Å c= 5.3210 Å β= 104.970 ° |
| I/Icor | 1.09 |
| Calc. density | 3.205 g/cm³ |
| Reference | Phillips M. W., Draheim J. E., Popp R. K., Clowe C. A., Pinkerton A. A., "Effects of oxidation-dehydrogenation in tschermakitic hornblende sample H-1, natural", American Mineralogist **74**, 764-773 (1989) |

***F: Anorthite (2.7 %)***

| | |
|---|---|
| Formula sum | Al Ca O4 Si |
| Entry number | 96-900-1173 |
| Figure-of-Merit (FoM) | 0.654532 |
| Total number of peaks | 248 |
| Peaks in range | 248 |
| Peaks matched | 131 |
| Intensity scale factor | 0.04 |
| Space group | I -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.0820 Å b= 12.7670 Å c= 14.0320 Å α= 92.790° β= 115.770 ° γ= 91.680 ° |
| I/Icor | 0.68 |
| Calc. density | 3.250 g/cm³ |
| Reference | Angel R. J., "High-pressure structure of anorthite Sample: P = 25 kbar", American Mineralogist **73**, 1114-1119 (1988) |

***G: Quartz (1.6 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-900-5025 |
| Figure-of-Merit (FoM) | 0.695380 |
| Total number of peaks | 35 |
| Peaks in range | 35 |
| Peaks matched | 11 |
| Intensity scale factor | 0.12 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.9841 Å c= 5.4500 Å |
| I/Icor | 3.65 |
| Calc. density | 2.552 g/cm³ |
| Reference | Kihara K., "An X-ray study of the temperature dependence of the quartz structure Sample: at T = 838 K", European Journal of Mineralogy **2**, 63-77 (1990) |

***H: Montmorillonite (0.0 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O12 Si4 |
| Entry number | 96-110-1055 |
| Figure-of-Merit (FoM) | 0.671105 |
| Total number of peaks | 92 |
| Peaks in range | 91 |
| Peaks matched | 66 |
| Intensity scale factor | 0.00 |
| Space group | P 1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 5.1800 Å b= 8.9800 Å c= 15.0000 Å α= 90.000° β= 90.000 ° γ= 90.000 ° |
| I/Icor | 20.53 |
| Calc. density | 1.800 g/cm³ |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Bytowr | Al7.76 Ca3.44 Na0.56 O32 Si8.24 | 96-901-1202 | 0.6464 |

## Search-Match

***Settin***

| | |
|---|---|
| Refere | )D-Inorg REV89244 2013.10.11 |
| Autom | s |
| Minimu | 0 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Selection Criteria

**Compound:**

***Name:*** Bytownite

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 6.68 | 13.2181 | 171.24 | 0.8800 | C,D,H |
| 2 | 11.63 | 7.6043 | 240.49 | 0.8800 | D,E,F |
| 3 | 11.93 | 7.4100 | 281.14 | 0.8800 | H |
| 4 | 12.13 | 7.2880 | 356.65 | 0.8800 | C |
| 5 | 12.49 | 7.0827 | 308.68 | 0.8800 | |
| 6 | 12.84 | 6.8890 | 165.03 | 0.8800 | D,F |
| 7 | 12.84 | 6.8890 | 155.55 | 0.8800 | |
| 8 | 12.84 | 6.8890 | 155.55 | 0.8800 | |
| 9 | 18.36 | 4.8271 | 258.80 | 0.8800 | A,B,C,D,E,F,H |
| 10 | 19.43 | 4.5659 | 156.65 | 0.8800 | B,C,D,E,F,H |
| 11 | 20.11 | 4.4128 | 1000.00 | 0.8800 | B,C,D,E,H |
| 12 | 20.35 | 4.3607 | 897.75 | 0.8800 | C,D |
| 13 | 20.43 | 4.3444 | 899.14 | 0.8800 | C,F |
| 14 | 20.66 | 4.2957 | 746.56 | 0.8800 | A,B,D,G,H |
| 15 | 20.66 | 4.2957 | 752.71 | 0.8800 | |
| 16 | 20.66 | 4.2957 | 746.56 | 0.8800 | |
| 17 | 20.90 | 4.2469 | 657.95 | 0.8800 | C,D,F |
| 18 | 20.90 | 4.2469 | 649.04 | 0.8800 | |
| 19 | 20.90 | 4.2469 | 649.04 | 0.8800 | |
| 20 | 21.17 | 4.1933 | 652.03 | 0.8800 | B,E |
| 21 | 21.34 | 4.1604 | 634.53 | 0.8800 | D |
| 22 | 21.34 | 4.1604 | 625.75 | 0.8800 | |
| 23 | 21.34 | 4.1604 | 625.75 | 0.8800 | |
| 24 | 21.50 | 4.1298 | 583.17 | 0.8800 | C,D |
| 25 | 21.50 | 4.1298 | 575.06 | 0.8800 | |
| 26 | 21.50 | 4.1298 | 575.06 | 0.8800 | |
| 27 | 21.68 | 4.0959 | 511.35 | 0.8800 | B,C,F |
| 28 | 21.68 | 4.0959 | 521.78 | 0.8800 | |
| 29 | 21.68 | 4.0959 | 511.35 | 0.8800 | |
| 30 | 21.98 | 4.0413 | 413.43 | 0.8800 | D,E |
| 31 | 22.28 | 3.9869 | 373.00 | 0.8800 | E,F |
| 32 | 22.28 | 3.9869 | 373.00 | 0.8800 | |
| 33 | 22.30 | 3.9834 | 377.24 | 0.8800 | C,D,F |
| 34 | 22.51 | 3.9470 | 334.64 | 0.8800 | B,D,F |
| 35 | 22.68 | 3.9183 | 333.58 | 0.8800 | D,F |
| 36 | 22.92 | 3.8765 | 292.36 | 0.8800 | A,C,D,E,F |
| 37 | 23.05 | 3.8558 | 290.63 | 0.8800 | B,D,F,H |
| 38 | 23.36 | 3.8053 | 260.69 | 0.8800 | C,D,F |
| 39 | 23.74 | 3.7442 | 289.00 | 0.8800 | A,B,D,F,H |
| 40 | 24.23 | 3.6702 | 408.24 | 0.8800 | C,D,F |
| 41 | 24.42 | 3.6423 | 393.80 | 0.8800 | D,F |
| 42 | 24.77 | 3.5914 | 486.16 | 0.8800 | B,C,D,F |
| 43 | 25.09 | 3.5463 | 499.48 | 0.8800 | D,F |
| 44 | 25.32 | 3.5147 | 429.74 | 0.8800 | C,D |
| 45 | 25.38 | 3.5065 | 414.60 | 0.8800 | A,D,F |
| 46 | 25.38 | 3.5065 | 414.60 | 0.8800 | |
| 47 | 25.71 | 3.4621 | 317.49 | 0.8800 | A,B,D |
| 48 | 25.96 | 3.4295 | 229.43 | 0.8800 | C,D,F |
| 49 | 26.38 | 3.3752 | 254.32 | 0.8800 | D,E,G |
| 50 | 26.66 | 3.3413 | 285.46 | 0.8800 | B,F,H |
| 51 | 26.82 | 3.3213 | 275.55 | 0.8800 | B,C |
| 52 | 27.06 | 3.2925 | 183.64 | 0.8800 | E |
| 53 | 27.49 | 3.2421 | 194.36 | 0.8800 | B,C,D,E,F |
| 54 | 33.25 | 2.6924 | 249.94 | 0.8800 | A,B,C,D,E,F |
| 55 | 35.11 | 2.5539 | 422.57 | 0.8800 | A,B,C,D,E,F,H |
| 56 | 35.62 | 2.5183 | 650.51 | 0.8800 | A,C,D,F |
| 57 | 35.92 | 2.4981 | 496.56 | 0.8800 | B,C,D,F,H |
| 58 | 35.92 | 2.4981 | 496.56 | 0.8800 | |
| 59 | 35.94 | 2.4968 | 485.67 | 0.8800 | B,D,G,H |
| 60 | 36.18 | 2.4810 | 373.06 | 0.8800 | C,D,E,F |
| 61 | 36.66 | 2.4494 | 396.49 | 0.8800 | A,B,C,D,E,F,H |
| 62 | 36.82 | 2.4391 | 360.12 | 0.8800 | B,C,D,E,F |
| 63 | 36.82 | 2.4391 | 352.35 | 0.8800 | |
| 64 | | | 2.35 | 0.8800 | |
| 65 | | | 7.89 | 0.8800 | D,E,F |
| 66 | | | 3.71 | 0.8800 | C,D,E |
| 67 | | | 2.35 | 0.8800 | A,B,C,D,E,F |
| 68 | | | 5.27 | 0.8800 | D,F |
| 69 | | | 3.86 | 0.8800 | A,C,F |
| 70 | | | 5.82 | 0.8800 | E |
| 71 | | | 5.82 | 0.8800 | |
| 72 | | | 0.75 | 0.8800 | C,D,F |
| 73 | | | 6.33 | 0.8800 | A,B,D,E,F |
| 74 | | | 0.76 | 0.8800 | C,D,E,F,G,H |
| 75 | | | 3.67 | 0.8800 | C,D,E,F |
| 76 | 39.44 | 2.2829 | 214.33 | 0.8800 | C,D |
| 77 | 39.44 | 2.2829 | 206.22 | 0.8800 | |
| 78 | 39.44 | 2.2829 | 206.22 | 0.8800 | |

| | | | | | |
|---|---|---|---|---|---|
| 79 | 39.61 | 2.2733 | 198.13 | 0.8800 | A,C,D,F,G |
| 80 | 39.94 | 2.2554 | 164.80 | 0.8800 | B,C,D,E |
| 81 | 40.14 | 2.2445 | 199.51 | 0.8800 | A,B,F,H |
| 82 | 40.38 | 2.2319 | 193.69 | 0.8800 | B,C,D,E,F |
| 83 | 40.75 | 2.2123 | 211.04 | 0.8800 | B,C,D,E,F,H |
| 84 | 41.02 | 2.1988 | 154.06 | 0.8800 | B,C,D,E,F,H |
| 85 | 41.74 | 2.1621 | 164.72 | 0.8800 | A,B,C,D,E,F,G,H |
| 86 | 54.42 | 1.6847 | 302.11 | 0.8800 | A,B,C,E,G,H |
| 87 | 54.74 | 1.6756 | 275.48 | 0.8800 | B,C,E,G |
| 88 | 54.92 | 1.6705 | 232.64 | 0.8800 | A,B,C,H |
| 89 | 55.07 | 1.6663 | 221.95 | 0.8800 | |
| 90 | 55.32 | 1.6592 | 215.75 | 0.8800 | B |
| 91 | 55.57 | 1.6524 | 190.25 | 0.8800 | B,C,E,H |
| 92 | 56.10 | 1.6381 | 155.92 | 0.8800 | A,B,C,E,G |
| 93 | 56.80 | 1.6196 | 163.56 | 0.8800 | A,B,C,E |
| 94 | 57.12 | 1.6112 | 164.34 | 0.8800 | A,B,C,E,H |
| 95 | 62.43 | 1.4864 | 421.49 | 0.8800 | A,B,C,E,H |
| 96 | 62.58 | 1.4831 | 404.73 | 0.8800 | B,E |
| 97 | 62.88 | 1.4768 | 275.45 | 0.8800 | A,B,C,E,H |
| 98 | 62.88 | 1.4768 | 289.45 | 0.8800 | |
| 99 | 62.88 | 1.4768 | 275.45 | 0.8800 | |
| 100 | 63.18 | 1.4705 | 171.50 | 0.8800 | A,B,C,E,G,H |
| 101 | 63.18 | 1.4705 | 154.30 | 0.8800 | |
| 102 | 63.18 | 1.4705 | 154.30 | 0.8800 | |
| 103 | 63.86 | 1.4565 | 201.95 | 0.8800 | B,E |
| 104 | 64.08 | 1.4520 | 162.23 | 0.8800 | A,B,C,E,G,H |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

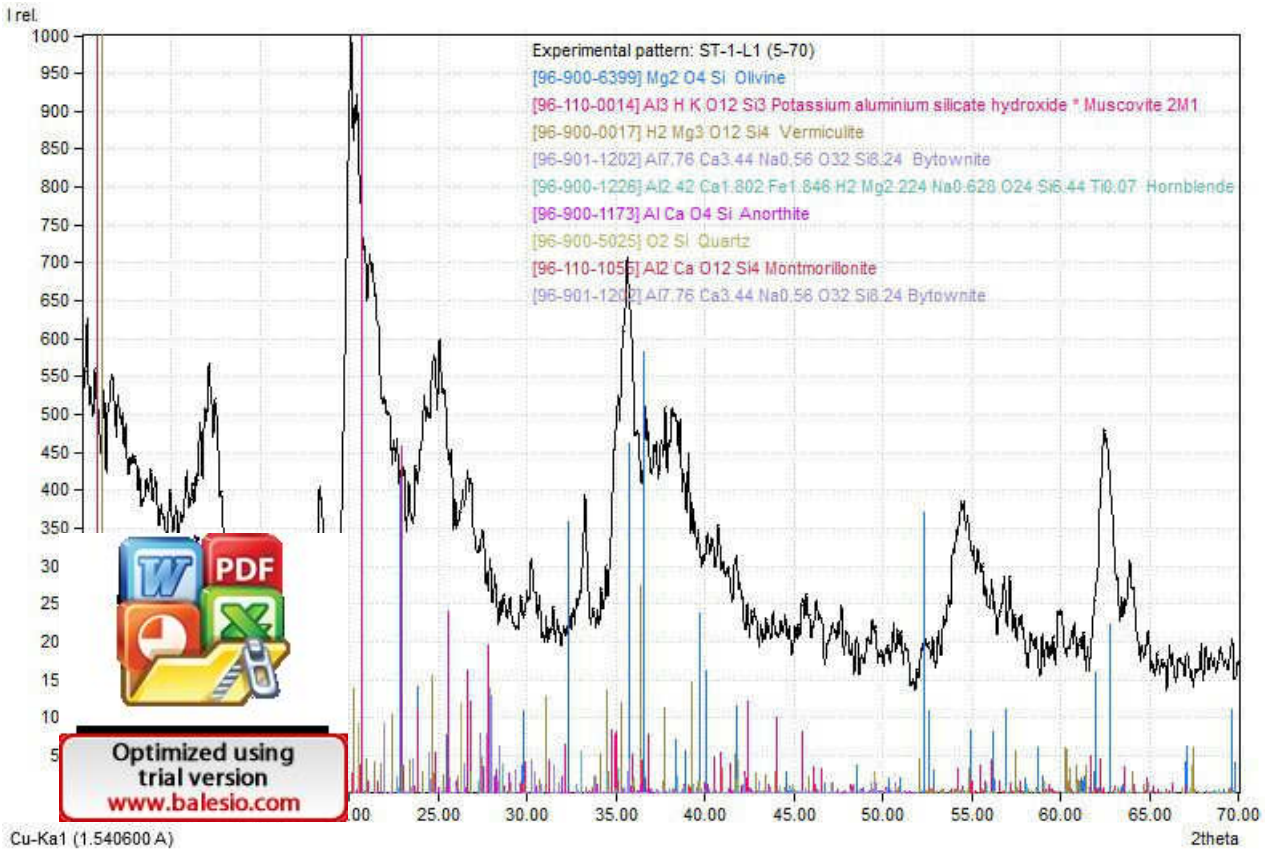
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 113962 | 100.00% |
| Background radiation | 75249 | 66.03% |
| Diffraction peaks | 38713 | 33.97% |
| Peak area belonging to selected phases | 37411 | 32.83% |
| Unidentified peak area | 1302 | 1.14% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 4940 | 100.00% |
| Peak intensity belonging to selected phases | 1026 | 20.77% |
| Unidentified peak intensity | 3914 | 79.23% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-2-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-2-L1.RAW |
| File path | D:/S2 Geologi/data hasil/17 sampel/ST-2-L1 |
| Data collected | Jan 5, 2024 16:52:43 |
| Data range | 5.030° - 70.030° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.03° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 33.3 | Anorthite | Al2 Ca O8 Si2 |
| B | 23.2 | Olivine | Fe0.2 Mg1.792 Mn0.003 Ni0.005 O4 Si |
| C | 10.9 | Quartz | O2 Si |
| D | 10.5 | Potassium aluminium silicate hydroxide * Muscovite 2M1 | Al3 H2 K O12 Si3 |
| E | 10.5 | Hornblende | Al2.42 Ca1.83 Fe1.852 H1.34 Mg2.218 Na0.706 O24 Si6.44 Ti0.07 |
| F | 7.0 | Pyroxene | Al1.388 Ca0.742 Fe0.162 Mg0.016 O6 Si1.5 |
| G | 3.1 | Montmorillonite | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| H | 1.5 | Vermiculite | Al0.57 H1.4 Mg1.705 O7.86 Si1.43 |
| | *18.0* | *Unidentified peak area* | |

***A: Anorthite (33.3 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0362 |
| Figure-of-Merit (FoM) | 0.770657 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 288 |
| Intensity scale factor | 0.31 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 92.980° β= 115.820 ° γ= 91.150 ° |
| I/Icor | 0.60 |
| Calc. density | 2.745 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 410 C", American Mineralogist **58**, 665-675 (1973) |

***B: Olivine (23.2 %)***

| | |
|---|---|
| Formula sum | Fe0.2 Mg1.792 Mn0.003 Ni0.005 O4 Si |
| Entry number | 96-900-5917 |
| Figure-of-Merit (FoM) | 0.714859 |
| Total number of peaks | 168 |
| Peaks in range | 168 |
| Peaks matched | 42 |
| Intensity scale factor | 0.33 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit cell | a= 4.7631 Å b= 10.2230 Å c= 5.9920 Å |
| I/Icor | 0.90 |
| Calc. density | 3.353 g/cm³ |
| Reference | Ottonello G., Princivalle F., Della Giusta A., "Temperature, composition, and fO2 effects on intersite distribution of Mg and Fe2+ in olivines Sample: CC37a", Physics and Chemistry of Minerals **17**, 301-312 (1990) |

***C: Quartz (10.9 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-901-2603 |
| Figure-of-Merit (FoM) | 0.702299 |
| Total number of peaks | 32 |
| Peaks in range | 32 |
| Peaks matched | 11 |
| Intensity scale factor | 0.43 |
| Space group | P 31 2 1 |
| Crysta | onal (hexagonal axes) |
| Unit ce | 4.7050 Å c= 5.2500 Å |
| I/Icor | 3 |
| Calc. d | 74 g/cm³ |
| Refere | zen R. M., Finger L. W., Hemley R. J., Mao H. K., "High-pressure crystal chemistry and amorphization of alpha-quartz Locality: thetic Sample: P = 5.1 GPa", Solid State Communications **72**, 507-511 (1989) |



***D: Pot hydro %)***

| | |
|---|---|
| Formu | H2 K O12 Si3 |
| Entry number | 96-101-1050 |
| Figure-of-Merit (FoM) | 0.824334 |
| Total number of peaks | 299 |
| Peaks in range | 299 |

| | |
|---|---|
| Peaks in range | 299 |
| Peaks matched | 105 |
| Intensity scale factor | 0.53 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1800 Å b= 9.0200 Å c= 20.0400 Å β= 95.500 ° |
| I/Icor | 3.19 |
| Meas. density | 2.798 g/cm³ |
| Calc. density | 2.830 g/cm³ |
| Reference | Jackson W W, West J, "The Crystal Structure of Muscovite - K Al3 Si3 O10 (O H)2", Zeitschrift fuer Kristallographie, Kristallgeometrie, Kristallphysik, Kristallchemie (-144,1977) **76**, 211-227 (1931) |

***E: Hornblende (10.5 %)***

| | |
|---|---|
| Formula sum | Al2.42 Ca1.83 Fe1.852 H1.34 Mg2.218 Na0.706 O24 Si6.44 Ti0.07 |
| Entry number | 96-900-1228 |
| Figure-of-Merit (FoM) | 0.765631 |
| Total number of peaks | 299 |
| Peaks in range | 299 |
| Peaks matched | 118 |
| Intensity scale factor | 0.16 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 9.7860 Å b= 18.0240 Å c= 5.3060 Å β= 105.090 ° |
| I/Icor | 0.97 |
| Calc. density | 3.241 g/cm³ |
| Reference | Phillips M. W., Draheim J. E., Popp R. K., Clowe C. A., Pinkerton A. A., "Effects of oxidation-dehydrogenation in tschermakitic hornblende sample H-3, after annealing at 700 C", American Mineralogist **74**, 764-773 (1989) |

***F: Pyroxene (7.0 %)***

| | |
|---|---|
| Formula sum | Al1.388 Ca0.742 Fe0.162 Mg0.016 O6 Si1.5 |
| Entry number | 96-900-6564 |
| Figure-of-Merit (FoM) | 0.764486 |
| Total number of peaks | 229 |
| Peaks in range | 229 |
| Peaks matched | 57 |
| Intensity scale factor | 0.13 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 9.7190 Å b= 8.8140 Å c= 5.3050 Å β= 106.040 ° |
| I/Icor | 1.20 |
| Calc. density | 3.266 g/cm³ |
| Reference | Okui M., Sawada H., Marumo F., "Structure refinement of a nonstoichiometric pyroxene synthesized under ambient pressure", Physics and Chemistry of Minerals **25**, 318-322 (1998) |

***G: Montmorillonite (3.1 %)***

| | |
|---|---|
| Formula sum | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| Entry number | 96-901-0959 |
| Figure-of-Merit (FoM) | 0.754715 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 62 |
| Intensity scale factor | 0.29 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1710 Å b= 8.9570 Å c= 9.7400 Å β= 96.100 ° |
| I/Icor | 5.89 |
| Calc. density | 2.245 g/cm³ |
| Reference | Gournis D., Lappas A., Karakassides M. A., Tobbens D., Moukarika A., "A neutron diffraction study of alkali cation migration in montmorillonites Sample: Li-mont-300", Physics and Chemistry of Minerals **35**, 49-58 (2008) |

***H: Vermiculite (1.5 %)***

| | |
|---|---|
| Formula sum | Al0.57 H1.4 Mg1.705 O7.86 Si1.43 |
| Entry number | 96-900-0147 |
| Figure-of-Merit (FoM) | 0.775151 |
| Total number of peaks | 291 |
| Peaks in range | 290 |
| Peaks matched | 124 |
| Intensity scale factor | 0.22 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3490 Å b= 9.2550 Å c= 28.8900 Å β= 97.120 ° |
| I/Icor | 9.57 |
| Calc. density | 2.096 g/cm³ |
| Refere | Shirozu H., Bailey S. W., "Crystal structure of a two-layer Mg-vermiculite", American Mineralogist **51**, 1124-1143 (1966) |



## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-900-9667 | 0.6995 |
| Silicor | O2 Si | 96-500-0036 | 0.6946 |
| Quartz | O2 Si | 96-901-3322 | 0.6941 |
| Quartz | O2 Si | 96-901-2601 | 0.6937 |
| Quartz | O2 Si | 96-901-2605 | 0.6817 |
| Quartz | O2 Si | 96-900-8094 | 0.6793 |
| Quartz | O2 Si | 96-901-2602 | 0.6721 |
| Quartz | O2 Si | 96-900-8093 | 0.6699 |
| Quartz | O2 Si | 96-901-2604 | 0.6525 |
| Quartz | O2 Si | 96-900-5033 | 0.6521 |

| | | | |
|---|---|---|---|
| Quartz | O2 Si | 96-900-5034 | 0.6521 |
| Quartz | O2 Si | 96-900-5027 | 0.6321 |
| Quartz | O2 Si | 96-900-5026 | 0.6316 |
| Quartz | O2 Si | 96-900-5029 | 0.6315 |
| Quartz | O2 Si | 96-900-5028 | 0.6310 |
| Quartz | O2 Si | 96-900-5030 | 0.6309 |
| Quartz | O2 Si | 96-900-5031 | 0.6309 |
| Quartz | O2 Si | 96-900-5032 | 0.6299 |
| Quartz | O2 Si | 96-901-2603 | 0.6154 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Selection Criteria

**Compound:**

***Name:*** Quartz

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 6.28 | 14.0648 | 159.14 | 0.2800 | H |
| 2 | 6.42 | 13.7642 | 178.65 | 0.2800 | |
| 3 | 6.79 | 13.0067 | 195.00 | 0.2800 | |
| 4 | 6.91 | 12.7820 | 185.33 | 0.2800 | A |
| 5 | 7.17 | 12.3197 | 169.36 | 0.2800 | |
| 6 | 7.33 | 12.0505 | 152.91 | 0.2800 | |
| 7 | 7.55 | 11.6951 | 150.06 | 0.2800 | |
| 8 | 7.75 | 11.3975 | 129.31 | 0.2800 | |
| 9 | 8.34 | 10.5902 | 138.70 | 0.2800 | |
| 10 | 8.84 | 9.9945 | 129.96 | 0.2800 | D,G |
| 11 | 10.58 | 8.3578 | 122.84 | 0.2800 | A,E |
| 12 | 10.89 | 8.1144 | 121.34 | 0.2800 | A |
| 13 | 11.39 | 7.7628 | 141.37 | 0.2800 | |
| 14 | 11.65 | 7.5929 | 191.95 | 0.2800 | |
| 15 | 12.12 | 7.2962 | 231.23 | 0.2800 | A |
| 16 | 12.27 | 7.2077 | 211.19 | 0.2800 | H |
| 17 | 12.45 | 7.1039 | 160.25 | 0.2800 | |
| 18 | 12.63 | 7.0031 | 121.17 | 0.2800 | A |
| 19 | 18.32 | 4.8383 | 348.26 | 0.2800 | A,D,E,G |
| 20 | 18.49 | 4.7947 | 272.66 | 0.2800 | A,E,F,H |
| 21 | 20.08 | 4.4195 | 508.59 | 0.2800 | A,D,E,F,G,H |
| 22 | 20.22 | 4.3887 | 525.35 | 0.2800 | A,D |
| 23 | 20.35 | 4.3605 | 509.10 | 0.2800 | |
| 24 | 20.47 | 4.3352 | 491.15 | 0.2800 | A,B,H |
| 25 | 20.65 | 4.2970 | 440.98 | 0.2800 | A,D |
| 26 | 20.96 | 4.2351 | 324.89 | 0.2800 | A,D,H |
| 27 | 21.30 | 4.1671 | 345.45 | 0.2800 | A,D,E,G,H |
| 28 | 22.02 | 4.0337 | 1000.00 | 0.2800 | A,C,E,G,H |
| 29 | 22.60 | 3.9318 | 208.94 | 0.2800 | A,D,E,G |
| 30 | 22.83 | 3.8919 | 227.93 | 0.2800 | A,B,E,H |
| 31 | 23.09 | 3.8487 | 213.28 | 0.2800 | A,D |
| 32 | 23.35 | 3.8072 | 239.59 | 0.2800 | A,H |
| 33 | 23.75 | 3.7434 | 398.52 | 0.2800 | A,B,D |
| 34 | 23.99 | 3.7059 | 241.16 | 0.2800 | A,E |
| 35 | 24.33 | 3.6558 | 293.42 | 0.2800 | A,F |
| 36 | 24.69 | 3.6036 | 300.33 | 0.2800 | A,H |
| 37 | 24.79 | 3.5887 | 304.99 | 0.2800 | A,D,H |
| 38 | 25.05 | 3.5515 | 289.06 | 0.2800 | A |
| 39 | 25.55 | 3.4835 | 230.15 | 0.2800 | A,B,D,H |
| 40 | 25.81 | 3.4494 | 268.07 | 0.2800 | A,G,H |
| 41 | 26.34 | 3.3809 | 171.45 | 0.2800 | A,E |
| 42 | 26.74 | 3.3315 | 257.99 | 0.2800 | D,F,H |
| 43 | 26.87 | 3.3154 | 244.87 | 0.2800 | |
| 44 | 27.06 | 3.2930 | 221.69 | 0.2800 | A,G |
| 45 | | | 4.10 | 0.2800 | A,E,G,H |
| 46 | | | 6.05 | 0.2800 | A,C,D,F |
| 47 | | | 9.08 | 0.2800 | A,H |
| 48 | | | 0.82 | 0.2800 | A,D,E,G |
| 49 | | | 5.86 | 0.2800 | A,B,D,E,F,H |
| 50 | | | 6.43 | 0.2800 | A |
| 51 | | | 1.36 | 0.2800 | A,E,F |
| 52 | | | 4.55 | 0.2800 | A,D,F,H |
| 53 | | | 0.61 | 0.2800 | A,D,E,G,H |
| 54 | | | 3.85 | 0.2800 | A,B,D,E,F,G,H |
| 55 | | | 8.11 | 0.2800 | A,B,E,F,G |
| 56 | | | 6.58 | 0.2800 | A,D,E,H |
| 57 | 36.35 | 2.4695 | 280.81 | 0.2800 | A,E |
| 58 | 36.53 | 2.4577 | 286.31 | 0.2800 | A,B,D,E,G |
| 59 | 36.86 | 2.4368 | 194.45 | 0.2800 | A,D,E,G,H |

| | | | | | |
|---|---|---|---|---|---|
| 60 | 37.34 | 2.4060 | 225.20 | 0.2800 | A,E,G |
| 61 | 37.50 | 2.3965 | 210.78 | 0.2800 | A,E,H |
| 62 | 37.73 | 2.3821 | 232.32 | 0.2800 | A,B,D,G,H |
| 63 | 37.95 | 2.3690 | 179.43 | 0.2800 | A,E,F,H |
| 64 | 38.16 | 2.3564 | 198.81 | 0.2800 | E |
| 65 | 38.27 | 2.3502 | 199.10 | 0.2800 | A,B,C |
| 66 | 38.57 | 2.3324 | 150.60 | 0.2800 | A,E,F,G,H |
| 67 | 38.93 | 2.3116 | 143.48 | 0.2800 | A,B,D,E,H |
| 68 | 39.21 | 2.2960 | 163.92 | 0.2800 | A,E,F,H |
| 69 | 39.39 | 2.2857 | 144.65 | 0.2800 | A,E |
| 70 | 39.61 | 2.2735 | 118.18 | 0.2800 | A,B,H |
| 71 | 40.25 | 2.2388 | 146.74 | 0.2800 | A,B,D,E,H |
| 72 | 40.40 | 2.2307 | 145.48 | 0.2800 | A,D,E,F,G,H |
| 73 | 40.80 | 2.2100 | 139.52 | 0.2800 | A,C,E,F,G,H |
| 74 | 40.93 | 2.2032 | 135.86 | 0.2800 | A,D,F,H |
| 75 | 41.09 | 2.1951 | 121.21 | 0.2800 | A |
| 76 | 41.22 | 2.1882 | 122.30 | 0.2800 | A,D,E,G |
| 77 | 41.77 | 2.1609 | 196.95 | 0.2800 | A,B,C,D,E,F,H |
| 78 | 44.38 | 2.0396 | 117.62 | 0.2800 | A,B,C,D,E,F,G,H |
| 79 | 49.47 | 1.8409 | 164.99 | 0.2800 | A,B,D,E,F,G,H |
| 80 | 49.81 | 1.8292 | 161.57 | 0.2800 | A,B,D,E,F,G,H |
| 81 | 50.66 | 1.8004 | 149.38 | 0.2800 | A,B,E,F,H |
| 82 | 51.01 | 1.7891 | 171.44 | 0.2800 | A,B,D,H |
| 83 | 51.15 | 1.7844 | 155.45 | 0.2800 | A,D,F,G,H |
| 84 | 52.33 | 1.7470 | 142.23 | 0.2800 | B,C,E,G,H |
| 85 | 52.46 | 1.7428 | 141.50 | 0.2800 | B,D,H |
| 86 | 53.13 | 1.7226 | 130.73 | 0.2800 | D,E,F,G,H |
| 87 | 53.65 | 1.7070 | 124.15 | 0.2800 | B,D,E,H |
| 88 | 54.11 | 1.6936 | 252.36 | 0.2800 | D,E |
| 89 | 54.22 | 1.6903 | 259.55 | 0.2800 | D,E,G,H |
| 90 | 54.49 | 1.6825 | 184.64 | 0.2800 | D,E,G |
| 91 | 54.93 | 1.6702 | 149.96 | 0.2800 | B,D,E,F,H |
| 92 | 55.10 | 1.6655 | 143.69 | 0.2800 | F |
| 93 | 55.23 | 1.6619 | 141.52 | 0.2800 | D,H |
| 94 | 55.41 | 1.6568 | 128.74 | 0.2800 | D,G,H |
| 95 | 55.92 | 1.6429 | 130.19 | 0.2800 | D,E,G,H |
| 96 | 56.21 | 1.6352 | 137.35 | 0.2800 | B,D,E,F |
| 97 | 56.37 | 1.6309 | 120.66 | 0.2800 | D,E,G,H |
| 98 | 57.11 | 1.6116 | 140.78 | 0.2800 | B,C,D,E,F,G,H |
| 99 | 57.30 | 1.6066 | 136.31 | 0.2800 | B,C,D,E,F,H |
| 100 | 62.10 | 1.4934 | 186.29 | 0.2800 | B,D,E,F,G,H |
| 101 | 62.44 | 1.4861 | 296.34 | 0.2800 | D,E,F,G |
| 102 | 62.68 | 1.4809 | 195.17 | 0.2800 | B,D,H |
| 103 | 62.85 | 1.4774 | 181.56 | 0.2800 | C,E,G |
| 104 | 63.00 | 1.4744 | 176.03 | 0.2800 | D,E,F,G,H |
| 105 | 63.26 | 1.4688 | 139.05 | 0.2800 | B,D,E,F |
| 106 | 63.41 | 1.4657 | 125.91 | 0.2800 | B,D,E,G |
| 107 | 63.96 | 1.4544 | 161.70 | 0.2800 | D,E,F,G,H |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

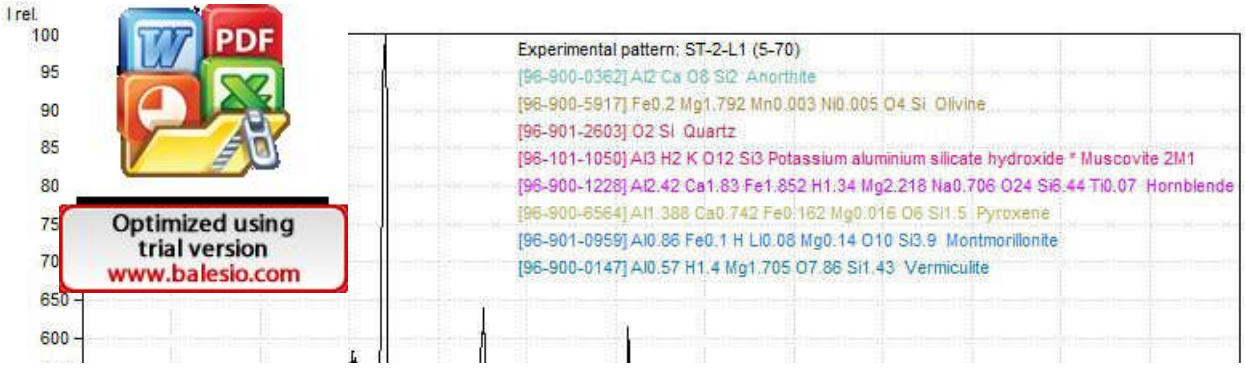
**Based on calculated profile**

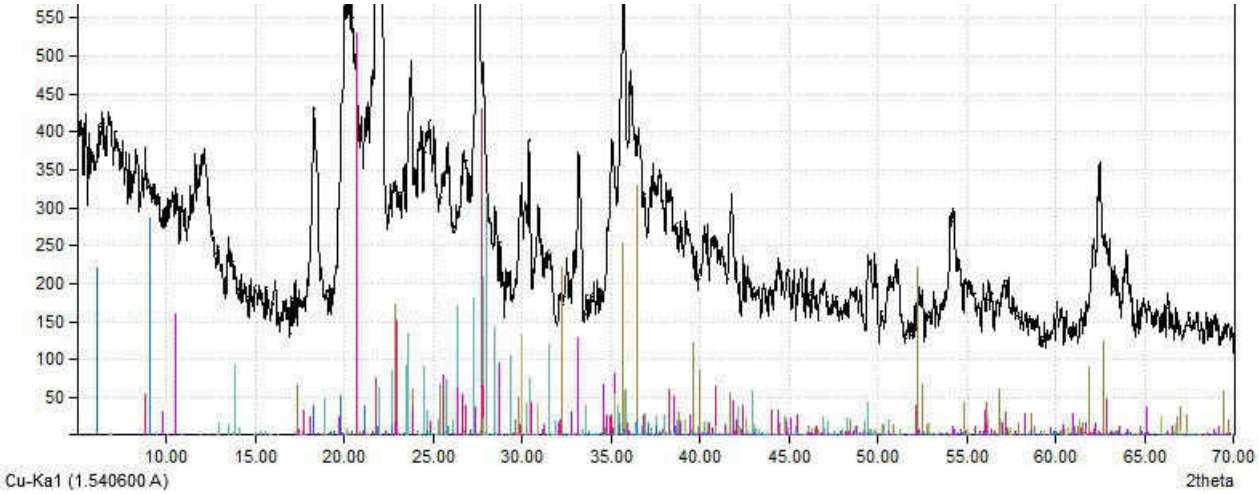
| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 123329 | 100.00% |
| Background radiation | 75775 | 61.44% |
| Diffraction peaks | 47554 | 38.56% |
| Peak area belonging to selected phases | 25302 | 20.52% |
| Unidentified peak area | 22252 | 18.04% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 1442 | 100.00% |
| Peak intensity belonging to selected phases | 542 | 37.61% |
| Unidentified peak intensity | 899 | 62.39% |

## Diffraction Pattern Graphics





# Match! Phase Analysis Report

## Sample: ST-3-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-3-L1.RAW |
| File path | D:/S2 Geologi/data hasil/17 sampel/ST-3-L1 |
| Data collected | Jan 5, 2024 16:52:43 |
| Data range | 5.010° - 70.010° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.01° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 34.1 | Muscovite | Al2.73 Ba0.01 H2.86 K0.465 N0.36 Na0.03 O11.236 Si3.128 |
| B | 30.4 | Anorthite | Al2 Ca O8 Si2 |
| C | 22.3 | Olivine | Co0.249 Mg1.749 O4 Si |
| D | 8.3 | Quartz | O2 Si |
| E | 4.4 | Montmorillonite | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| F | 0.5 | Vermiculite | H2 Mg3 O12 Si4 |
| | *11.1* | *Unidentified peak area* | |

***A: Muscovite (34.1 %)***

| | |
|---|---|
| Formula sum | Al2.73 Ba0.01 H2.86 K0.465 N0.36 Na0.03 O11.236 Si3.128 |
| Entry number | 96-901-5971 |
| Figure-of-Merit (FoM) | 0.759576 |
| Total number of peaks | 300 |
| Peaks in range | 300 |
| Peaks matched | 125 |
| Intensity scale factor | 0.46 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 9.0270 Å b= 5.1999 Å c= 20.6160 Å β= 100.113 ° |
| I/Icor | 0.77 |
| Calc. density | 2.576 g/cm³ |
| Reference | Mesto E., Scordari F., Lacalamita M., Schingaro E., "Tobelite and NH4+ -rich muscovite single crystals from Ordovician Armorican sandstones (Brittany, France): Structure and crystal chemistry Note: sample musc_4", American Mineralogist **97**, 1460-1468 (2012) |

***B: Anorthite (30.4 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0362 |
| Figure-of-Merit (FoM) | 0.762263 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 328 |
| Intensity scale factor | 0.32 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 92.980° β= 115.820 ° γ= 91.150 ° |
| I/Icor | 0.60 |
| Calc. density | 2.745 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 410 C", American Mineralogist **58**, 665-675 (1973) |

***C: Olivine (22.3 %)***

| | |
|---|---|
| Formula sum | Co0.249 Mg1.749 O4 Si |
| Entry number | 96-900-6398 |
| Figure-of-Merit (FoM) | 0.705303 |
| Total number of peaks | 168 |
| Peaks in range | 168 |
| Peaks matched | 39 |
| Intensity scale factor | 0.40 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit ce | 4.7585 Å b= 10.2148 Å c= 5.9846 Å |
| I/Icor | 2 |
| Calc. d | 07 g/cm³ |
| Refere | ller-Sommer M, Hock R., Kirfel A., "Rietveld refinement study of the cation distribution in (Co, Mg)-olivine solid solution mple: M87", Physics and Chemistry of Minerals **24**, 17-23 (1997) |

***D: Qua***

| | |
|---|---|
| Formu | Si |
| Entry n | -900-5020 |
| Figure | 07379 |
| Total n | |
| Peaks in range | 35 |
| Peaks matched | 11 |
| Intensity scale factor | 0.45 |
| Space group | P 32 2 1 |

| | |
|---|---|
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.9297 Å c= 5.4151 Å |
| I/Icor | 3.07 |
| Calc. density | 2.625 g/cm³ |
| Reference | Kihara K., "An X-ray study of the temperature dependence of the quartz structure Sample: at T = 498 K", European Journal of Mineralogy **2**, 63-77 (1990) |

***E: Montmorillonite (4.4 %)***

| | |
|---|---|
| Formula sum | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| Entry number | 96-901-0959 |
| Figure-of-Merit (FoM) | 0.730056 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 60 |
| Intensity scale factor | 0.45 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1710 Å b= 8.9570 Å c= 9.7400 Å β= 96.100 ° |
| I/Icor | 5.89 |
| Calc. density | 2.245 g/cm³ |
| Reference | Gournis D., Lappas A., Karakassides M. A., Tobbens D., Moukarika A., "A neutron diffraction study of alkali cation migration in montmorillonites Sample: Li-mont-300", Physics and Chemistry of Minerals **35**, 49-58 (2008) |

***F: Vermiculite (0.5 %)***

| | |
|---|---|
| Formula sum | H2 Mg3 O12 Si4 |
| Entry number | 96-900-0017 |
| Figure-of-Merit (FoM) | 0.732434 |
| Total number of peaks | 263 |
| Peaks in range | 262 |
| Peaks matched | 120 |
| Intensity scale factor | 0.20 |
| Space group | C 1 c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3300 Å b= 9.1800 Å c= 28.8500 Å β= 93.250 ° |
| I/Icor | 23.53 |
| Calc. density | 1.786 g/cm³ |
| Reference | Hendricks S. B., Jefferson M. E., "Crystal structure of vermiculites and mixed vermiculite-chlorites", American Mineralogist **23**, 851-862 (1938) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| | Br2 F17 Sb2 | 96-431-1869 | 0.7895 |
| | C F20 O4 Te4 | 96-430-8273 | 0.7872 |
| Antigorite-T | Mg48 O147 Si34 | 96-901-6234 | 0.7865 |
| potassium hydroxopentafluoroarsenate | As F5 H K O | 96-200-3122 | 0.7863 |
| Tridymite | O2 Si | 96-900-0521 | 0.7852 |
| | Cs F30 O6 Sb Te6 | 96-432-7610 | 0.7837 |
| Tridymite | O2 Si | 96-901-3492 | 0.7828 |
| Kaolinite | Al2 H4 O9 Si2 | 96-900-9235 | 0.7824 |
| Antigorite | H79 Mg48 O147 Si34 | 96-900-3104 | 0.7799 |
| Antigorite | H62 Mg48 O147 Si34 | 96-900-4515 | 0.7791 |
| Tridymite | O2 Si | 96-901-3493 | 0.7788 |
| Kaolinite | Al2 H4 O9 Si2 | 96-900-9231 | 0.7764 |
| Metaschoepite | H34 Na0.47 O37.082 U8 | 96-901-0199 | 0.7748 |
| Metaschoepite | H34 Na0.48 O37.91 U8 | 96-901-0195 | 0.7745 |
| meta-schoepite | H16 O20 U4 | 96-210-2097 | 0.7742 |
| Metaschoepite | H34 O40 U8 | 96-901-1299 | 0.7742 |
| Hexaammine cobalt(III) hydrogenarseniate tetrahydrate | As3 Co2 H47 N12 O16 | 96-150-0006 | 0.7719 |
| Metaschoepite | H34 Na1.16 O37.9 U8 | 96-901-0198 | 0.7700 |
| | Cl H64 K5 Mo12 O57 P2 S12 | 96-411-2785 | 0.7696 |
| Metaschoepite | H32 Na1.22 O39.09 U8 | 96-901-0197 | 0.7693 |
| Potassium aluminium silicate hydroxide * (Muscovite 2M1) | Al3 H2 K O12 Si3 | 96-101-1050 | 0.7683 |
| Potassium aluminium silicate hydroxide * (Muscovite 2M1) | Al3 H K O12 Si3 | 96-110-0014 | 0.7683 |
| Tetraborane | B4 H10 | 96-430-4422 | 0.7680 |
| Metaschoepite | H32 Na1.09 O38.328 U8 | 96-901-0196 | 0.7671 |
| | C2 F22 N2 S6 Sb4 | 96-431-6375 | 0.7668 |
| | C6 Al3 O15 P2 | 96-700-6431 | 0.7668 |
| Dimolybdenum(V) dioxide tetraphosphate | Mo2 O15 P4 | 96-100-1468 | 0.7665 |
| | Mo O7.5 P2 | 96-901-4374 | 0.7665 |
| Tamarugite | Al H12 Na O14 S2 | 96-900-0182 | 0.7662 |
| | As2 F20 Mg Xe4 | 96-431-0410 | 0.7661 |
| Khade | Al F H10 O9 S | 96-900-9710 | 0.7655 |
| | Cl F17 Sb2 | 96-431-1868 | 0.7653 |
| | C0 F8 Fe2 N6 O8 P2 | 96-411-4284 | 0.7646 |
| | Mo3 O22.5 P6 | 96-430-3254 | 0.7642 |
| Antigo | H58 Mg45 O138 Si32 | 96-900-4000 | 0.7642 |
| Xe2 F1 | F14 O3 Os Xe2 | 96-431-5229 | 0.7639 |
| lanthir | H22.62 O27 U6 | 96-901-2907 | 0.7635 |
| Alumir ; 2M) | Al2 H4 O9 Si2 | 96-101-1046 | 0.7634 |
| Dickite | Al2 H4 O9 Si2 | 96-900-0123 | 0.7634 |
| | O45 P9 V12 | 96-400-1392 | 0.7631 |
| Zippei | H27 Na5 O52 S4 U8 | 96-900-4756 | 0.7628 |
| Triamr | H12 In N3 O12 S3 | 96-100-4054 | 0.7622 |
| Bementite | Mn6.683 O23 Si6 | 96-900-1585 | 0.7608 |
| Tridymite | O2 Si | 96-900-6969 | 0.7595 |
| | Mo2 O15 P4 | 96-430-3255 | 0.7592 |

| | | | |
|---|---|---|---|
| | As2 F12 S8 | 96-432-1675 | 0.7586 |
| Dickite | Al2 H4 O9 Si2 | 96-900-3082 | 0.7576 |
| Kaolinite | Al2 O9 Si2 | 96-901-5000 | 0.7574 |
| | C F11 N S3 Sb2 | 96-431-6377 | 0.7572 |
| | Mo3 O22.5 P6 | 96-430-3256 | 0.7570 |
| (Xe2 F11) (Au F6) | Au F17 Xe2 | 96-433-1415 | 0.7569 |
| Dialuminium phyllo-disilicate tetrahydroxide (Nacrite 6M) | Al2 H4 O9 Si2 | 96-101-1063 | 0.7568 |

***and 150 others...***

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 6.85 | 12.8969 | 167.10 | 0.4800 | B,F |
| 2 | 8.76 | 10.0888 | 206.15 | 0.4800 | A |
| 3 | 9.00 | 9.8146 | 235.21 | 0.4800 | B,E |
| 4 | 11.91 | 7.4275 | 208.76 | 0.4800 | B |
| 5 | 12.15 | 7.2802 | 271.82 | 0.4800 | |
| 6 | 12.35 | 7.1612 | 241.51 | 0.4800 | F |
| 7 | 12.35 | 7.1612 | 241.51 | 0.4800 | |
| 8 | 12.52 | 7.0620 | 183.94 | 0.4800 | B |
| 9 | 18.36 | 4.8277 | 1000.00 | 0.4800 | A,B,E,F |
| 10 | 20.29 | 4.3731 | 885.07 | 0.4800 | A,B,E,F |
| 11 | 20.47 | 4.3352 | 833.58 | 0.4800 | B,F |
| 12 | 20.47 | 4.3352 | 833.58 | 0.4800 | |
| 13 | 20.71 | 4.2855 | 578.55 | 0.4800 | A,B,D |
| 14 | 20.71 | 4.2855 | 578.55 | 0.4800 | |
| 15 | 20.88 | 4.2502 | 501.82 | 0.4800 | A,B,F |
| 16 | 21.13 | 4.2012 | 445.41 | 0.4800 | E |
| 17 | 21.13 | 4.2012 | 445.41 | 0.4800 | |
| 18 | 21.47 | 4.1355 | 408.73 | 0.4800 | B,F |
| 19 | 22.06 | 4.0259 | 698.50 | 0.4800 | B,E,F |
| 20 | 22.45 | 3.9571 | 229.29 | 0.4800 | A,B,F |
| 21 | 22.45 | 3.9571 | 229.29 | 0.4800 | |
| 22 | 22.62 | 3.9270 | 187.77 | 0.4800 | B,E |
| 23 | 22.81 | 3.8961 | 219.29 | 0.4800 | A,B,C,F |
| 24 | 23.22 | 3.8275 | 213.14 | 0.4800 | A,B |
| 25 | 23.46 | 3.7887 | 194.71 | 0.4800 | B,F |
| 26 | 23.69 | 3.7521 | 226.11 | 0.4800 | B |
| 27 | 23.88 | 3.7227 | 306.48 | 0.4800 | B,C |
| 28 | 24.27 | 3.6639 | 385.11 | 0.4800 | A,B,F |
| 29 | 24.62 | 3.6128 | 373.00 | 0.4800 | A,B,F |
| 30 | 24.86 | 3.5790 | 363.88 | 0.4800 | B,F |
| 31 | 25.13 | 3.5408 | 249.77 | 0.4800 | A,B |
| 32 | 25.13 | 3.5408 | 249.77 | 0.4800 | |
| 33 | 25.47 | 3.4950 | 264.68 | 0.4800 | B,C,F |
| 34 | 25.91 | 3.4363 | 187.97 | 0.4800 | A,B,E,F |
| 35 | 26.77 | 3.3277 | 637.38 | 0.4800 | B,D,F |
| 36 | 26.99 | 3.3009 | 494.33 | 0.4800 | E |
| 37 | 26.99 | 3.3009 | 494.33 | 0.4800 | |
| 38 | 27.29 | 3.2649 | 184.33 | 0.4800 | B |
| 39 | 27.57 | 3.2324 | 224.18 | 0.4800 | A,B,E,F |
| 40 | 27.77 | 3.2103 | 212.42 | 0.4800 | B |
| 41 | 27.96 | 3.1884 | 169.81 | 0.4800 | A,B |
| 42 | 28.74 | 3.1043 | 179.97 | 0.4800 | A,B,C,E,F |
| 43 | 33.22 | 2.6948 | 425.75 | 0.4800 | B,C,E,F |
| 44 | 35.09 | 2.5551 | 185.60 | 0.4800 | A,B,C,E,F |
| 45 | 35.33 | 2.5388 | 240.89 | 0.4800 | A,B,E,F |
| 46 | 35.70 | 2.5127 | 547.36 | 0.4800 | A,B,C,E,F |
| 47 | 36.11 | 2.4855 | 411.91 | 0.4800 | A,B,F |
| 48 | 36.67 | 2.4487 | 477.46 | 0.4800 | A,B,C,D,E,F |
| 49 | 37.09 | 2.4222 | 348.45 | 0.4800 | A,B,E |
| 50 | 37.22 | 2.4140 | 361.90 | 0.4800 | A,B |
| 51 | 37.67 | 2.3861 | 458.33 | 0.4800 | A,B,C,F |
| 52 | 37.93 | 2.3702 | 322.03 | 0.4800 | B,E |
| 53 | | | .03 | 0.4800 | |
| 54 | | | .06 | 0.4800 | C,F |
| 55 | | | .40 | 0.4800 | A,B,E |
| 56 | | | .40 | 0.4800 | B,C,F |
| 57 | | | .40 | 0.4800 | |
| 58 | | | .98 | 0.4800 | A,B,F |
| 59 | | | .61 | 0.4800 | A,B,D,F |
| 60 | | | .88 | 0.4800 | B,C,F |
| 61 | | | .34 | 0.4800 | A,B,C,D,E,F |
| 62 | | | .39 | 0.4800 | A,B,E,F |
| 63 | | | .83 | 0.4800 | A,B,E,F |
| 64 | 41.75 | 2.1618 | 226.07 | 0.4800 | A,B,C,D,E,F |
| 65 | 44.36 | 2.0404 | 165.44 | 0.4800 | A,B,C,E,F |
| 66 | 45.49 | 1.9923 | 154.46 | 0.4800 | B,F |
| 67 | 45.61 | 1.9875 | 160.00 | 0.4800 | A,B,C,D,E,F |

| | | | | | |
|---|---|---|---|---|---|
| 67 | 45.61 | 1.9875 | 160.90 | 0.4800 | A,B,C,D,E,F |
| 68 | 49.52 | 1.8391 | 162.24 | 0.4800 | A,B,C,D,E,F |
| 69 | 54.21 | 1.6906 | 349.59 | 0.4800 | A,C,E,F |
| 70 | 54.49 | 1.6827 | 222.12 | 0.4800 | A,E,F |
| 71 | 54.87 | 1.6718 | 168.12 | 0.4800 | A,C,D,F |
| 72 | 55.31 | 1.6596 | 209.02 | 0.4800 | A,C,D,E,F |
| 73 | 62.45 | 1.4859 | 319.47 | 0.4800 | A,C,E,F |
| 74 | 62.69 | 1.4808 | 245.56 | 0.4800 | A,C,E,F |
| 75 | 62.69 | 1.4808 | 245.56 | 0.4800 | |
| 76 | 63.96 | 1.4544 | 284.41 | 0.4800 | A,C,D,E,F |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

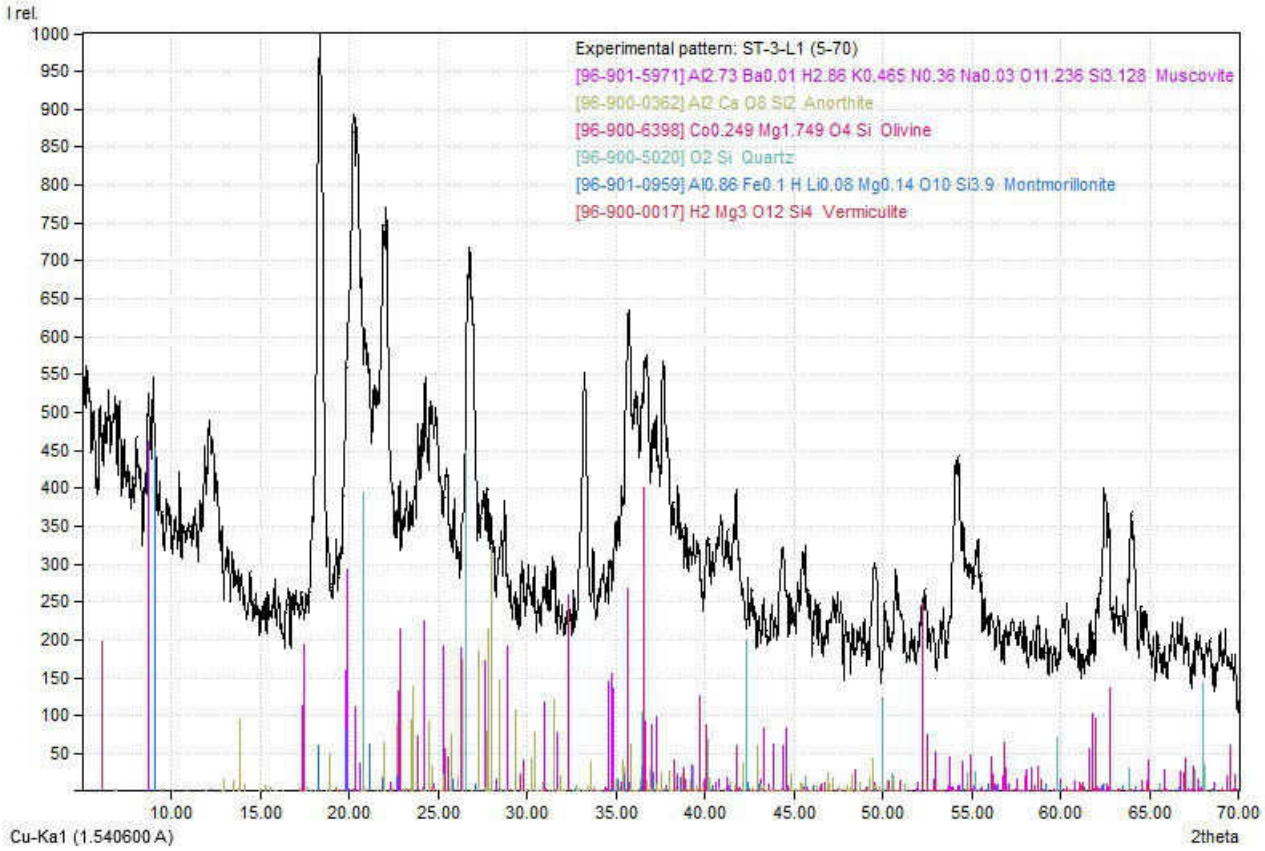
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 116218 | 100.00% |
| Background radiation | 79054 | 68.02% |
| Diffraction peaks | 37164 | 31.98% |
| Peak area belonging to selected phases | 24262 | 20.88% |
| Unidentified peak area | 12902 | 11.10% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 1700 | 100.00% |
| Peak intensity belonging to selected phases | 749 | 44.07% |
| Unidentified peak intensity | 951 | 55.93% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-4-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-4-L1.RAW |
| File path | D:/S2 Geologi/data hasil/17 sampel/ST-4-L1 |
| Data collected | Jan 5, 2024 16:52:43 |
| 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 |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 65.4 | Muscovite | Al2.726 Ca0.011 Fe0.03 K0.776 Mg0.02 Na0.181 O11 Si3.15 Ti0.02 |
| B | 16.3 | Olivine | Mg0.5 Ni1.5 O4 Si |
| C | 10.5 | Quartz | O2 Si |
| D | 7.8 | Anorthite | Al2 Ca O8 Si2 |
| | *8.6* | *Unidentified peak area* | |

***A: Muscovite (65.4 %)***

| | |
|---|---|
| Formula sum | Al2.726 Ca0.011 Fe0.03 K0.776 Mg0.02 Na0.181 O11 Si3.15 Ti0.02 |
| Entry number | 96-901-2887 |
| Figure-of-Merit (FoM) | 0.762865 |
| Total number of peaks | 144 |
| Peaks in range | 142 |
| Peaks matched | 110 |
| Intensity scale factor | 0.50 |
| Space group | C 1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 5.2234 Å b= 9.1790 Å c= 20.2353 Å α= 90.000° β= 95.834 ° γ= 90.000 ° |
| I/Icor | 0.77 |
| Calc. density | 2.588 g/cm³ |
| Reference | Tomita K., Shiraki K., Kawano M., "Crystal structure of dehydroxylated 2M1 sericite and its relationship with mixed-layer mica/smectite Locality: Goto mine, Nagasaki Prefecture, Japan Sample: heated", Clay Science **10**, 423-441 (1998) |

***B: Olivine (16.3 %)***

| | |
|---|---|
| Formula sum | Mg0.5 Ni1.5 O4 Si |
| Entry number | 96-900-1102 |
| Figure-of-Merit (FoM) | 0.735460 |
| Total number of peaks | 164 |
| Peaks in range | 164 |
| Peaks matched | 42 |
| Intensity scale factor | 0.30 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit cell | a= 4.7331 Å b= 10.1565 Å c= 5.9285 Å |
| I/Icor | 1.83 |
| Calc. density | 4.480 g/cm³ |
| Reference | Bostrom D., "Single-crystal X-ray diffraction studies of synthetic Ni-Mg olivine solid solutions Sample: XNi2+ = .75", American Mineralogist **72**, 965-972 (1987) |

***C: Quartz (10.5 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-900-7379 |
| Figure-of-Merit (FoM) | 0.677413 |
| Total number of peaks | 35 |
| Peaks in range | 35 |
| Peaks matched | 11 |
| Intensity scale factor | 0.31 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.9800 Å c= 5.4600 Å |
| I/Icor | 2.99 |
| Calc. density | 2.552 g/cm³ |
| Refere | sa A. L., El-Barbary A.A, Heggie M. I., Briddon P. R., "Structural and thermodynamic properties of water related defects in ha-quartz Note: Hypothetical structure derived using density-functional theory", Physics and Chemistry of Minerals **32**, 323-1 (2005) |

***D: An***

| | |
|---|---|
| Formu | Ca O8 Si2 |
| Entry n | 900-0362 |
| Figure | 32741 |
| Total n | 0 |
| Peaks | 5 |
| Peaks | 7 |
| Intensity scale factor | 0.05 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 93.930° β= 115.820° γ= 91.150° |

| | |
|---|---|
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 92.980° β= 115.820° γ= 91.150° |
| I/Icor | 0.60 |
| Calc. density | 2.745 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 410 C", American Mineralogist **58**, 665-675 (1973) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Antigorite | H62 Mg48 O147 Si34 | 96-900-4515 | 0.8044 |
| Antigorite | H58 Mg45 O138 Si32 | 96-900-4000 | 0.8018 |
| | O5 S Ti | 96-210-0943 | 0.7994 |
| | Cs F30 O6 Sb Te6 | 96-432-7610 | 0.7977 |
| Antigorite | H79 Mg48 O147 Si34 | 96-900-3104 | 0.7970 |
| Becquerelite | Ca O30 U6 | 96-900-1111 | 0.7966 |
| aluminum phosphate | Al O4 P | 96-201-0797 | 0.7949 |
| Antigorite-T | Mg48 O147 Si34 | 96-901-6234 | 0.7942 |
| | Br2 F17 Sb2 | 96-431-1869 | 0.7930 |
| Becquerelite | Ca H22 O30 U6 | 96-901-2088 | 0.7925 |
| Becquerelite | Ca H22 O30 U6 | 96-900-2701 | 0.7918 |
| Billietite | Ba O23 U6 | 96-900-1112 | 0.7896 |
| Olympite | Li Na5 O8 P2 | 96-901-2623 | 0.7891 |
| Khademite | Al F H10 O9 S | 96-900-9710 | 0.7879 |
| | As2 F20 Mg Xe4 | 96-431-0410 | 0.7843 |
| Ianthinite | H22.62 O27 U6 | 96-901-2907 | 0.7840 |
| tetrafluorobromate undecafluorodiantimonate | Br F15 Sb2 | 96-431-8956 | 0.7823 |
| | C2 F22 N2 S6 Sb4 | 96-431-6375 | 0.7814 |
| K Au5 P2 S8 | Au5 K P2 S8 | 96-402-7827 | 0.7806 |
| Billietite | Ba H6 O30 U6 | 96-901-0600 | 0.7798 |
| Dialuminium phyllo-disilicate tetrahydroxide * (Nacrite 4M) | Al2 H4 O9 Si2 | 96-101-1081 | 0.7796 |
| Kaolinite | Al2 H4 O9 Si2 | 96-900-9235 | 0.7786 |
| | F14 Sb2 Xe | 96-431-6547 | 0.7784 |
| Triammonium indium sulfate | H12 In N3 O12 S3 | 96-100-4054 | 0.7780 |
| Thallium phosphate hydrate * | H23.5 O36.5 P8 Tl3.5 | 96-100-8946 | 0.7770 |
| | Al1.75 Na1.75 O4 Si0.25 | 96-200-2894 | 0.7769 |
| Nacrite | Al2 O9 Si2 | 96-901-4064 | 0.7757 |
| Schoepite | H18 O21 U4 | 96-900-4445 | 0.7752 |
| | Cs2 Ga6 H2 O26 P6 | 96-400-1539 | 0.7751 |
| Magnesium thiosulfate hexahydrate | H12 Mg O9 S2 | 96-110-0073 | 0.7741 |
| | Mg O9 S2 | 96-901-5179 | 0.7741 |
| Brianroulstonite | B5 Ca3 Cl2 H23 O21 | 96-900-4452 | 0.7734 |
| Tridymite | O2 Si | 96-901-3492 | 0.7729 |
| potassium hydroxopentafluoroarsenate | As F5 H K O | 96-200-3122 | 0.7728 |
| (Xe2 F11) (Au F6) | Au F17 Xe2 | 96-433-1415 | 0.7724 |
| Metaschoepite | H34 Na1.16 O37.9 U8 | 96-901-0198 | 0.7719 |
| | C0 F8 Fe2 N6 O8 P2 | 96-411-4284 | 0.7717 |
| | C12 Co N8 | 96-433-0306 | 0.7715 |
| | Al Cs2 O10 P3 | 96-700-9288 | 0.7714 |
| | Mo N2 O9 P2 | 96-901-4933 | 0.7714 |
| Vandendriesscheite | H33 O48 Pb2 U10 | 96-900-1892 | 0.7709 |
| | As2 H16 Mn O20 U2 | 96-900-4896 | 0.7708 |
| | Cs4 O18 P3 Te | 96-901-4415 | 0.7705 |
| | C14 Cl2 F8 | 96-402-4047 | 0.7699 |
| Kaolinite | Al2 H4 O9 Si2 | 96-900-9231 | 0.7698 |
| | C18 B3 F15 N18 | 96-701-0277 | 0.7697 |
| | C F20 O4 Te4 | 96-430-8273 | 0.7695 |
| 1,10-octachlorophenanthroline | C12 Cl8 N2 | 96-432-3462 | 0.7695 |
| | O36.5 P8 Tl3.5 | 96-901-5355 | 0.7695 |
| | B3 H3 N12 | 96-432-2188 | 0.7692 |
| | Cs2 Ga O10 P3 | 96-700-9289 | 0.7692 |
| | C16 Br2 N8 O2 Pd | 96-900-7878 | 0.7692 |

***and 151 others...***

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Peak List

| *No.* | | | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | | | .17 | 0.8800 | D |
| 2 | | | .95 | 0.8800 | |
| 3 | | | .24 | 0.8800 | |
| 4 | | | .12 | 0.8800 | D |
| 5 | | | .91 | 0.8800 | |
| 6 | | | .64 | 0.8800 | A,D |
| 7 | | | .00 | 0.8800 | A,D |
| 8 | | | .48 | 0.8800 | A,D |
| 9 | | | .74 | 0.8800 | A,B,C,D |
| 10 | | | .33 | 0.8800 | D |
| 11 | 21.24 | 4.1806 | 651.54 | 0.8800 | A |
| 12 | 21.50 | 4.1298 | 542.64 | 0.8800 | D |
| 13 | 21.77 | 4.0795 | 545.44 | 0.8800 | |
| 14 | 21.99 | 4.0387 | 526.39 | 0.8800 | A,D |

| | | | | | |
|---|---|---|---|---|---|
| 14 | 21.99 | 4.0387 | 536.39 | 0.8800 | A,D |
| 15 | 22.28 | 3.9864 | 354.03 | 0.8800 | A,D |
| 16 | 22.62 | 3.9274 | 286.95 | 0.8800 | A,D |
| 17 | 22.84 | 3.8901 | 233.65 | 0.8800 | D |
| 18 | 23.11 | 3.8453 | 272.91 | 0.8800 | B,D |
| 19 | 23.33 | 3.8098 | 280.37 | 0.8800 | A,D |
| 20 | 23.71 | 3.7500 | 264.83 | 0.8800 | D |
| 21 | 24.09 | 3.6918 | 389.41 | 0.8800 | B,D |
| 22 | 24.22 | 3.6723 | 390.66 | 0.8800 | D |
| 23 | 24.87 | 3.5773 | 496.23 | 0.8800 | A,D |
| 24 | 25.18 | 3.5339 | 425.71 | 0.8800 | A,D |
| 25 | 25.44 | 3.4988 | 384.89 | 0.8800 | D |
| 26 | 25.61 | 3.4750 | 341.27 | 0.8800 | B,D |
| 27 | 25.95 | 3.4304 | 290.41 | 0.8800 | D |
| 28 | 26.27 | 3.3896 | 239.25 | 0.8800 | A,C |
| 29 | 26.46 | 3.3658 | 204.93 | 0.8800 | A,D |
| 30 | 26.66 | 3.3406 | 194.73 | 0.8800 | |
| 31 | 27.04 | 3.2952 | 189.39 | 0.8800 | |
| 32 | 27.37 | 3.2562 | 191.36 | 0.8800 | A,D |
| 33 | 30.23 | 2.9540 | 148.07 | 0.8800 | A,B,D |
| 34 | 33.18 | 2.6977 | 223.20 | 0.8800 | A,B,D |
| 35 | 35.04 | 2.5585 | 434.90 | 0.8800 | A,B,D |
| 36 | 35.67 | 2.5151 | 771.73 | 0.8800 | A,D |
| 37 | 35.98 | 2.4941 | 453.24 | 0.8800 | A,B,C,D |
| 38 | 36.14 | 2.4834 | 386.32 | 0.8800 | D |
| 39 | 36.32 | 2.4715 | 334.37 | 0.8800 | D |
| 40 | 36.60 | 2.4530 | 308.63 | 0.8800 | A,D |
| 41 | 36.76 | 2.4429 | 284.16 | 0.8800 | A,B,D |
| 42 | 36.96 | 2.4300 | 281.22 | 0.8800 | D |
| 43 | 37.16 | 2.4175 | 301.35 | 0.8800 | D |
| 44 | 37.33 | 2.4070 | 320.59 | 0.8800 | A,D |
| 45 | 37.48 | 2.3976 | 298.15 | 0.8800 | D |
| 46 | 37.64 | 2.3878 | 280.08 | 0.8800 | A,D |
| 47 | 37.87 | 2.3736 | 302.91 | 0.8800 | B,D |
| 48 | 38.28 | 2.3496 | 364.89 | 0.8800 | A,D |
| 49 | 38.62 | 2.3292 | 280.00 | 0.8800 | A,B,D |
| 50 | 38.80 | 2.3191 | 288.11 | 0.8800 | D |
| 51 | 39.08 | 2.3029 | 245.44 | 0.8800 | A,B,C,D |
| 52 | 39.58 | 2.2752 | 176.93 | 0.8800 | A,C,D |
| 53 | 40.36 | 2.2330 | 154.32 | 0.8800 | A,B,D |
| 54 | 40.72 | 2.2140 | 163.67 | 0.8800 | A,D |
| 55 | 40.94 | 2.2026 | 149.44 | 0.8800 | A,D |
| 56 | 41.17 | 2.1908 | 163.73 | 0.8800 | A,B,C,D |
| 57 | 53.54 | 1.7103 | 152.90 | 0.8800 | A,B |
| 58 | 54.12 | 1.6932 | 261.71 | 0.8800 | A,B,C |
| 59 | 54.45 | 1.6837 | 207.19 | 0.8800 | A |
| 60 | 54.68 | 1.6772 | 235.36 | 0.8800 | A,C |
| 61 | 54.96 | 1.6693 | 182.73 | 0.8800 | |
| 62 | 55.08 | 1.6660 | 176.72 | 0.8800 | A |
| 63 | 55.30 | 1.6599 | 181.17 | 0.8800 | A,B |
| 64 | 55.54 | 1.6534 | 171.54 | 0.8800 | A |
| 65 | 57.20 | 1.6093 | 141.18 | 0.8800 | A,B,C |
| 66 | 62.05 | 1.4946 | 238.95 | 0.8800 | B |
| 67 | 62.43 | 1.4863 | 391.58 | 0.8800 | |
| 68 | 62.64 | 1.4819 | 342.23 | 0.8800 | B |
| 69 | 62.80 | 1.4785 | 237.49 | 0.8800 | |
| 70 | 63.01 | 1.4741 | 208.32 | 0.8800 | B,C |
| 71 | 63.72 | 1.4593 | 174.66 | 0.8800 | B |
| 72 | 63.88 | 1.4561 | 166.85 | 0.8800 | |
| 73 | 64.06 | 1.4524 | 150.84 | 0.8800 | B,C |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

**Based on calculated profile**

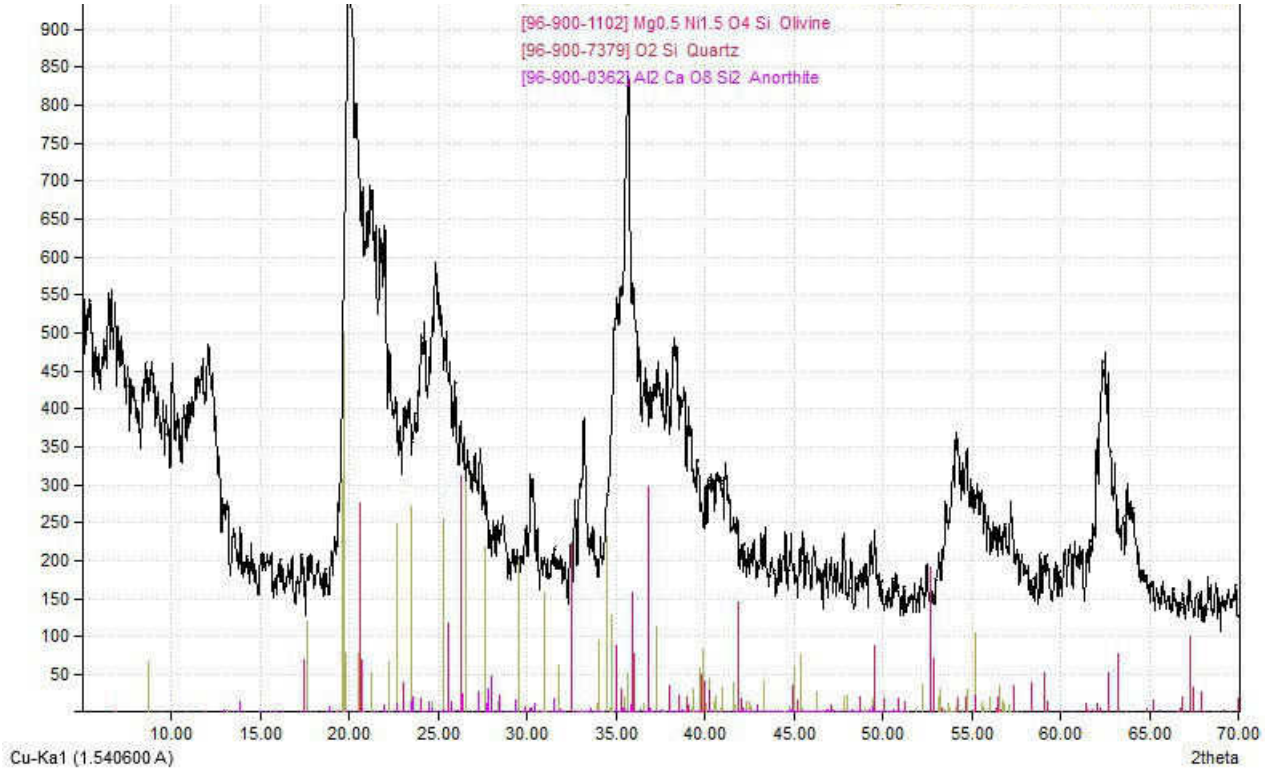
| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 103549 | 100.00% |
| Background radiation | 68273 | 65.93% |
| Diffraction peaks | 35277 | 34.07% |
| Peak area belonging to selected phases | 26383 | 25.48% |
| Unide | 8893 | 8.59% |



## Peak Residuals

| *Peak* | *Counts* | *Amount* |
|---|---|---|
| Overal | 3038 | 100.00% |
| Peak i ases | 985 | 32.43% |
| Unide | 2052 | 67.57% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-5-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-5-L1.RAW |
| File path | D:/S2 Geologi/data hasil/17 sampel/ST-5-L1 |
| Data collected | Jan 5, 2024 16:52:43 |
| Data range | 5.130° - 70.130° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.13° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 32.9 | Muscovite | Al2.8 Ba0.01 Fe0.08 H2 K0.9 Mg0.04 Na0.07 O12 Si3.04 Ti0.04 |
| B | 21.8 | Anorthite | Al2 Ca O8 Si2 |
| C | 12.6 | Olivine | Mg2 O4 Si |
| D | 12.5 | Albite | Al1.005 Na0.986 O8 Si2.995 |
| E | 8.0 | Pyroxene | Fe0.086 Mg0.914 O3 Si |
| F | 6.1 | Labradorite | Al0.824 Ca0.325 Na0.175 O4 Si1.174 |
| G | 6.1 | Quartz | O2 Si |
| | *9.6* | *Unidentified peak area* | |

***A: Muscovite (32.9 %)***

| | |
|---|---|
| Formula sum | Al2.8 Ba0.01 Fe0.08 H2 K0.9 Mg0.04 Na0.07 O12 Si3.04 Ti0.04 |
| Entry number | 96-900-6328 |
| Figure-of-Merit (FoM) | 0.704421 |
| Total number of peaks | 300 |
| Peaks in range | 300 |
| Peaks matched | 76 |
| Intensity scale factor | 0.32 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1510 Å b= 8.9310 Å c= 19.3990 Å β= 95.800 ° |
| I/Icor | 0.47 |
| Calc. density | 2.995 g/cm³ |
| Reference | Comodi P., Zanazzi P. F., "High-pressure structural study of muscovite Sample: K-Ms, P = 2.80 GPa", Physics and Chemistry of Minerals **22**, 170-177 (1995) |

***B: Anorthite (21.8 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-1259 |
| Figure-of-Merit (FoM) | 0.796398 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 201 |
| Intensity scale factor | 0.29 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1750 Å b= 12.8730 Å c= 14.1700 Å α= 93.110° β= 115.890 ° γ= 91.280 ° |
| I/Icor | 0.63 |
| Calc. density | 2.762 g/cm³ |
| Reference | Angel R. J., Carpenter M. A., Finger L. W., "Structural variation associated with compositional variation and order-disorder behavior in anorthite-rich feldspars sample from Val Pasmeda", American Mineralogist **75**, 150-162 (1990) |

***C: Olivine (12.6 %)***

| | |
|---|---|
| Formula sum | Mg2 O4 Si |
| Entry number | 96-900-1097 |
| Figure-of-Merit (FoM) | 0.656816 |
| Total number of peaks | 167 |
| Peaks in range | 167 |
| Peaks matched | 17 |
| Intensity scale factor | 0.20 |
| Space group | P b n m |
| Crysta | horhombic |
| Unit ce | 4.7490 Å b= 10.1985 Å c= 5.9792 Å |
| I/Icor | 7 |
| Calc. d | 25 g/cm³ |
| Refere | strom D., "Single-crystal X-ray diffraction studies of synthetic Ni-Mg olivine solid solutions Sample: XNi2+ = 0.00", American neralogist **72**, 965-972 (1987) |



***D: Alb***

| | |
|---|---|
| Formu | .005 Na0.986 O8 Si2.995 |
| Entry n | -900-0784 |
| Figure | 47406 |
| Total number of peaks | 250 |
| Peaks in range | 250 |
| Peaks matched | 87 |
| Intensity scale factor | 0.22 |

| | |
|---|---|
| Intensity scale factor | 0.22 |
| Space group | C -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1420 Å b= 12.7850 Å c= 7.1590 Å α= 94.190 ° β= 116.610 ° γ= 87.680 ° |
| I/Icor | 0.84 |
| Calc. density | 2.616 g/cm³ |
| Reference | Harlow G. E., Brown G. E., "Low albite: An X-Ray and neutron diffraction study Sample: X-ray single Na atom Note: this sample of feldspar is from Amelia, Virginia", American Mineralogist **65**, 986-995 (1980) |

***E: Pyroxene (8.0 %)***

| | |
|---|---|
| Formula sum | Fe0.086 Mg0.914 O3 Si |
| Entry number | 96-900-1220 |
| Figure-of-Merit (FoM) | 0.711879 |
| Total number of peaks | 430 |
| Peaks in range | 430 |
| Peaks matched | 63 |
| Intensity scale factor | 0.10 |
| Space group | P b c a |
| Crystal system | orthorhombic |
| Unit cell | a= 18.2430 Å b= 8.8340 Å c= 5.1900 Å |
| I/Icor | 0.60 |
| Calc. density | 3.274 g/cm³ |
| Reference | Molin G. M., "Crystal-chemical study of cation disordering in Al-rich and Al-poor orthopyroxenes from spinel lherzolite xenoliths sample Le9A, 1150 C, 10 min", American Mineralogist **74**, 593-598 (1989) |

***F: Labradorite (6.1 %)***

| | |
|---|---|
| Formula sum | Al0.824 Ca0.325 Na0.175 O4 Si1.174 |
| Entry number | 96-900-0748 |
| Figure-of-Merit (FoM) | 0.744135 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 84 |
| Intensity scale factor | 0.10 |
| Space group | C -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1747 Å b= 12.8706 Å c= 7.1014 Å α= 93.461 ° β= 116.086 ° γ= 90.514 ° |
| I/Icor | 0.75 |
| Calc. density | 2.704 g/cm³ |
| Reference | Wenk H. R., Joswig W., Tagai T., Korekawa M., Smith B. K., "The average structure of An 62-66 labradorite Lake County neutron feldspar", American Mineralogist **65**, 81-95 (1980) |

***G: Quartz (6.1 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-901-2604 |
| Figure-of-Merit (FoM) | 0.677968 |
| Total number of peaks | 31 |
| Peaks in range | 31 |
| Peaks matched | 5 |
| Intensity scale factor | 0.43 |
| Space group | P 31 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.6250 Å c= 5.2160 Å |
| I/Icor | 3.59 |
| Calc. density | 3.096 g/cm³ |
| Reference | Hazen R. M., Finger L. W., Hemley R. J., Mao H. K., "High-pressure crystal chemistry and amorphization of alpha-quartz Locality: synthetic Sample: P = 8.0 GPa", Solid State Communications **72**, 507-511 (1989) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-901-3322 | 0.6670 |
| Silicon oxide (Quartz) | O2 Si | 96-500-0036 | 0.6668 |
| Quartz | O2 Si | 96-901-2604 | 0.6588 |
| Quartz | O2 Si | 96-901-2603 | 0.6118 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Param | 0.50 |



## Selection Criteria

Compo

*Name* Quartz

## Peak List

| *No.* | | | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | | | .07 | 0.2800 | B |
| 2 | 7.04 | 12.5478 | 241.68 | 0.2800 | |
| 3 | 7.14 | 12.3662 | 237.79 | 0.2800 | |
| 4 | 19.90 | 4.4582 | 257.76 | 0.2800 | A,B,E |

| | | | | | |
|---|---|---|---|---|---|
| 5 | 20.27 | 4.3771 | 281.16 | 0.2800 | A,D,E |
| 6 | 20.37 | 4.3562 | 261.44 | 0.2800 | A,B,E,F |
| 7 | 20.37 | 4.3562 | 261.44 | 0.2800 | |
| 8 | 20.54 | 4.3205 | 249.58 | 0.2800 | B,C |
| 9 | 20.76 | 4.2757 | 231.01 | 0.2800 | B |
| 10 | 20.98 | 4.2302 | 306.18 | 0.2800 | A,B |
| 11 | 21.14 | 4.1992 | 290.88 | 0.2800 | |
| 12 | 21.31 | 4.1662 | 262.70 | 0.2800 | A,B |
| 13 | 21.31 | 4.1662 | 262.70 | 0.2800 | |
| 14 | 21.78 | 4.0769 | 295.16 | 0.2800 | B |
| 15 | 22.00 | 4.0369 | 333.37 | 0.2800 | A,B,D,E,F |
| 16 | 22.30 | 3.9829 | 294.73 | 0.2800 | B,E,G |
| 17 | 22.53 | 3.9432 | 256.83 | 0.2800 | B |
| 18 | 22.53 | 3.9432 | 256.83 | 0.2800 | |
| 19 | 22.84 | 3.8908 | 272.17 | 0.2800 | A,B,C,F |
| 20 | 23.06 | 3.8535 | 261.31 | 0.2800 | B,D |
| 21 | 23.32 | 3.8112 | 326.33 | 0.2800 | A,B,D |
| 22 | 23.77 | 3.7404 | 324.55 | 0.2800 | B,F |
| 23 | 23.94 | 3.7136 | 374.83 | 0.2800 | B,C,D |
| 24 | 24.36 | 3.6515 | 783.83 | 0.2800 | A,B,D,F |
| 25 | 24.80 | 3.5871 | 329.19 | 0.2800 | B |
| 26 | 25.16 | 3.5363 | 298.69 | 0.2800 | A,B,D |
| 27 | 25.72 | 3.4612 | 410.75 | 0.2800 | B,C,D,F |
| 28 | 26.01 | 3.4226 | 378.96 | 0.2800 | A,B,D,F |
| 29 | 26.40 | 3.3734 | 310.94 | 0.2800 | B,D,E,F |
| 30 | 26.88 | 3.3140 | 535.17 | 0.2800 | D,E |
| 31 | 27.23 | 3.2729 | 384.90 | 0.2800 | A |
| 32 | 27.41 | 3.2513 | 328.79 | 0.2800 | B,F |
| 33 | 27.41 | 3.2513 | 328.79 | 0.2800 | |
| 34 | 27.92 | 3.1925 | 562.05 | 0.2800 | A,B,D,E,F |
| 35 | 28.11 | 3.1719 | 379.73 | 0.2800 | B,D,E,F,G |
| 36 | 28.11 | 3.1719 | 379.73 | 0.2800 | |
| 37 | 28.29 | 3.1516 | 344.14 | 0.2800 | B,D,E |
| 38 | 28.57 | 3.1218 | 222.38 | 0.2800 | A,B,F |
| 39 | 28.57 | 3.1218 | 222.38 | 0.2800 | |
| 40 | 28.84 | 3.0931 | 217.98 | 0.2800 | B |
| 41 | 29.06 | 3.0700 | 214.25 | 0.2800 | A,B |
| 42 | 29.51 | 3.0249 | 257.93 | 0.2800 | B,C,E,F |
| 43 | 30.11 | 2.9655 | 479.41 | 0.2800 | B,C,D,F |
| 44 | 30.44 | 2.9345 | 356.82 | 0.2800 | B,D,E,F |
| 45 | 30.62 | 2.9177 | 359.00 | 0.2800 | A,B,D,F |
| 46 | 30.93 | 2.8887 | 219.67 | 0.2800 | B |
| 47 | 31.11 | 2.8729 | 234.09 | 0.2800 | B,D,E,F |
| 48 | 33.39 | 2.6815 | 964.12 | 0.2800 | A,B,D,E,F |
| 49 | 35.80 | 2.5060 | 1000.00 | 0.2800 | A,B,C,D,E,F |
| 50 | 36.21 | 2.4788 | 228.04 | 0.2800 | A,B,C,D,E,F |
| 51 | 36.21 | 2.4788 | 228.04 | 0.2800 | |
| 52 | 39.57 | 2.2759 | 214.66 | 0.2800 | A,B,C,D,E,F |
| 53 | 41.07 | 2.1958 | 388.92 | 0.2800 | A,B,D,E,F,G |
| 54 | 42.70 | 2.1159 | 230.42 | 0.2800 | A,B,D,E,F,G |
| 55 | 49.64 | 1.8349 | 372.55 | 0.2800 | A,B,C,D,E,F |
| 56 | 54.26 | 1.6891 | 408.48 | 0.2800 | A,C,D,E,F |
| 57 | 62.61 | 1.4825 | 289.63 | 0.2800 | A,C,D,E,F |
| 58 | 64.15 | 1.4505 | 250.37 | 0.2800 | A,D,E,F,G |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

**Based on calculated profile**

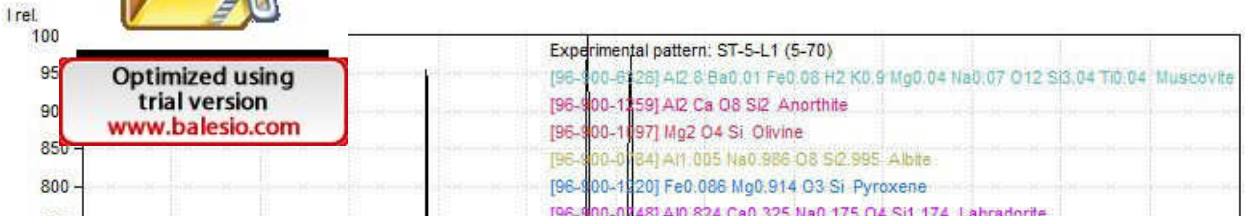
| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 172122 | 100.00% |
| Background radiation | 136953 | 79.57% |
| Diffraction peaks | 35170 | 20.43% |
| Peak area belonging to selected phases | 18637 | 10.83% |
| Unidentified peak area | 16533 | 9.61% |

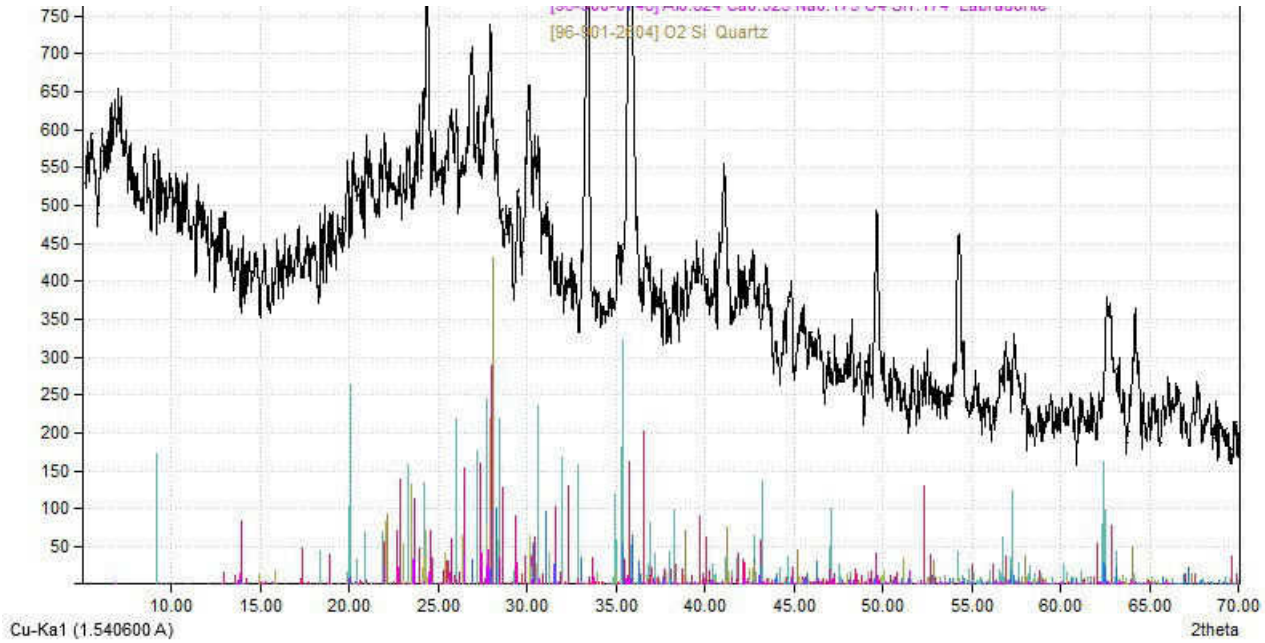
## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overal | 791 | 100.00% |
| Peak i ases | 367 | 46.34% |
| Unide | 425 | 53.66% |



## Diffraction Pattern Graphics





# Match! Phase Analysis Report

## Sample: ST-6-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-6-L1.RAW |
| File path | D:/S2 Geologi/data hasil/XRD Bu Ulva/ST-6-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 5.080° - 70.080° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.08° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 54.8 | Anorthite | Al2 Ca O8 Si2 |
| B | 15.1 | Olivine | Fe Mg O4 Si |
| C | 13.8 | Quartz | O2 Si |
| D | 6.7 | Vermiculite | C12 Mg3 N4 O12 Si4 |
| E | 5.4 | Montmorillonite | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| F | 4.2 | Pyroxene | Fe0.44 Mg0.56 O3 Si |
| | *1.7* | *Unidentified peak area* | |

***A: Anorthite (54.8 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0362 |
| Figure-of-Merit (FoM) | 0.817616 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 405 |
| Intensity scale factor | 0.60 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 92.980° β= 115.820 ° γ= 91.150 ° |
| I/Icor | 0.60 |
| Calc. density | 2.745 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 410 C", American Mineralogist **58**, 665-675 (1973) |

***B: Olivine (15.1 %)***

| | |
|---|---|
| Formula sum | Fe Mg O4 Si |
| Entry number | 96-900-6878 |
| Figure-of-Merit (FoM) | 0.732500 |
| Total number of peaks | 173 |
| Peaks in range | 173 |
| Peaks matched | 60 |
| Intensity scale factor | 0.35 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit cell | a= 4.8106 Å b= 10.3863 Å c= 6.0682 Å |
| I/Icor | 1.27 |
| Calc. density | 3.773 g/cm³ |
| Reference | Redfern S. A. T., Artioli G., Rinaldi R., Henderson C. M. B., Knight K. S., Wood B. J., "Octahedral cation ordering in olivine at high temperature. II: an in situ neutron powder diffraction study on synthetic MgFeSiO4 (Fa50) Sample: T = 300 C", Physics and Chemistry of Minerals **27**, 630-637 (2000) |

***C: Quartz (13.8 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-900-5022 |
| Figure-of-Merit (FoM) | 0.668722 |
| Total number of peaks | 35 |
| Peaks in range | 35 |
| Peaks matched | 14 |
| Intensity scale factor | 0.61 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit ce | 4.9509 Å c= 5.4285 Å |
| I/Icor | 4 |
| Calc. d | 96 g/cm³ |
| Refere | ara K., "An X-ray study of the temperature dependence of the quartz structure Sample: at T = 697 K", European Journal of neralogy **2**, 63-77 (1990) |

***D: Ver***

| | |
|---|---|
| Formu | 2 Mg3 N4 O12 Si4 |
| Entry n | -900-0119 |
| Figure | 764982 |
| Total n | 6 |
| Peaks in range | 305 |
| Peaks matched | 156 |
| Intensity scale factor | 0.43 |
| Space group | C 1 2 1 |

| | |
|---|---|
| Space group | C 1 2 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3300 Å b= 9.1800 Å c= 17.1200 Å β= 97.000 ° |
| I/Icor | 3.46 |
| Calc. density | 2.306 g/cm³ |
| Reference | Haase D. J., Weiss E. J., Steinfink H., "The crystal structure of a hexamethylene-diamine-vermiculite complex", American Mineralogist **48**, 261-270 (1963) |

***E: Montmorillonite (5.4 %)***

| | |
|---|---|
| Formula sum | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| Entry number | 96-901-0959 |
| Figure-of-Merit (FoM) | 0.703046 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 85 |
| Intensity scale factor | 0.58 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1710 Å b= 8.9570 Å c= 9.7400 Å β= 96.100 ° |
| I/Icor | 5.89 |
| Calc. density | 2.245 g/cm³ |
| Reference | Gournis D., Lappas A, Karakassides M. A., Tobbens D., Moukarika A, "A neutron diffraction study of alkali cation migration in montmorillonites Sample: Li-mont-300", Physics and Chemistry of Minerals **35**, 49-58 (2008) |

***F: Pyroxene (4.2 %)***

| | |
|---|---|
| Formula sum | Fe0.44 Mg0.56 O3 Si |
| Entry number | 96-900-1578 |
| Figure-of-Merit (FoM) | 0.739670 |
| Total number of peaks | 437 |
| Peaks in range | 437 |
| Peaks matched | 139 |
| Intensity scale factor | 0.05 |
| Space group | P b c a |
| Crystal system | orthorhombic |
| Unit cell | a= 18.3120 Å b= 8.9170 Å c= 5.2170 Å |
| I/Icor | 0.59 |
| Calc. density | 3.564 g/cm³ |
| Reference | Hazen R. M., Finger L. W., Ko J., "Effects of pressure on Mg-Fe ordering in orthopyroxene synthesized at 11.3 GPa and 1600 C", American Mineralogist **78**, 1336-1339 (1993) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-901-2606 | 0.6688 |
| Quartz | O2 Si | 96-901-1495 | 0.6674 |
| Quartz | O2 Si | 96-900-5022 | 0.6670 |
| Quartz | O2 Si | 96-900-5023 | 0.6668 |
| Quartz | O2 Si | 96-900-0778 | 0.6634 |
| Quartz | O2 Si | 96-900-5020 | 0.6567 |
| Quartz | O2 Si | 96-901-2603 | 0.6523 |
| Quartz | O2 Si | 96-900-5024 | 0.6506 |
| Quartz | O2 Si | 96-900-5021 | 0.6505 |
| Quartz | O2 Si | 96-901-0145 | 0.6501 |
| Quartz | O2 Si | 96-900-5019 | 0.6449 |
| Quartz | O2 Si | 96-901-2604 | 0.6441 |
| Quartz | O2 Si | 96-901-1494 | 0.6426 |
| Quartz | O2 Si | 96-901-2605 | 0.6420 |
| Quartz | O2 Si | 96-900-0777 | 0.6371 |
| Quartz | O2 Si | 96-900-0780 | 0.6334 |
| Quartz | O2 Si | 96-901-0146 | 0.6332 |
| Quartz | O2 Si | 96-901-0147 | 0.6315 |
| Quartz | O2 Si | 96-900-0779 | 0.6256 |
| Quartz | O2 Si | 96-900-5025 | 0.6255 |
| Quartz | O2 Si | 96-900-0776 | 0.6228 |
| Quartz | O2 Si | 96-900-5018 | 0.6218 |
| Quartz | O2 Si | 96-901-5023 | 0.6142 |
| Quartz | O2 Si | 96-900-7379 | 0.6091 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimu | 0.20 |
| Param | 0 |
| Param | 0 |
| Param | 0 |



## Selection Criteria

**Compo**

***Name*** Quartz

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 6.70 | 13.1878 | 184.00 | 1.2400 | A,D |

| | | | | | |
|---|---|---|---|---|---|
| 2 | 7.05 | 12.5349 | 179.70 | 1.2400 | A,E |
| 3 | 11.44 | 7.7311 | 210.74 | 1.2400 | A,D,F |
| 4 | 11.73 | 7.5395 | 262.85 | 1.2400 | |
| 5 | 12.02 | 7.3565 | 301.96 | 1.2400 | A |
| 6 | 12.32 | 7.1773 | 329.62 | 1.2400 | |
| 7 | 12.58 | 7.0308 | 205.01 | 1.2400 | A,F |
| 8 | 12.58 | 7.0308 | 205.01 | 1.2400 | |
| 9 | 19.48 | 4.5540 | 265.49 | 1.2400 | A,B,D,E,F |
| 10 | 20.03 | 4.4287 | 951.41 | 1.2400 | A,D,E,F |
| 11 | 20.34 | 4.3626 | 764.61 | 1.2400 | A,B,F |
| 12 | 20.34 | 4.3626 | 764.61 | 1.2400 | |
| 13 | 20.52 | 4.3247 | 675.54 | 1.2400 | A,C,D |
| 14 | 20.52 | 4.3247 | 675.54 | 1.2400 | |
| 15 | 21.03 | 4.2211 | 878.36 | 1.2400 | A,D |
| 16 | 21.19 | 4.1891 | 877.03 | 1.2400 | E |
| 17 | 21.55 | 4.1195 | 554.26 | 1.2400 | A |
| 18 | 21.74 | 4.0847 | 507.08 | 1.2400 | F |
| 19 | 21.74 | 4.0847 | 507.08 | 1.2400 | |
| 20 | 21.93 | 4.0499 | 403.82 | 1.2400 | A,D,E,F |
| 21 | 22.18 | 4.0044 | 426.27 | 1.2400 | A,F |
| 22 | 22.58 | 3.9344 | 384.21 | 1.2400 | A,B |
| 23 | 22.75 | 3.9053 | 318.53 | 1.2400 | A,E |
| 24 | 22.98 | 3.8663 | 304.86 | 1.2400 | A,D |
| 25 | 23.14 | 3.8405 | 321.04 | 1.2400 | A |
| 26 | 23.62 | 3.7640 | 692.62 | 1.2400 | A,B,D |
| 27 | 23.98 | 3.7080 | 422.79 | 1.2400 | A |
| 28 | 23.98 | 3.7080 | 422.79 | 1.2400 | |
| 29 | 24.35 | 3.6526 | 385.79 | 1.2400 | A |
| 30 | 24.58 | 3.6183 | 484.06 | 1.2400 | A,F |
| 31 | 25.01 | 3.5579 | 587.49 | 1.2400 | A,B,D |
| 32 | 25.33 | 3.5140 | 595.75 | 1.2400 | A,B |
| 33 | 25.74 | 3.4584 | 679.46 | 1.2400 | A,E |
| 34 | 26.23 | 3.3946 | 334.67 | 1.2400 | A,C,D,F |
| 35 | 26.77 | 3.3277 | 843.99 | 1.2400 | F |
| 36 | 27.10 | 3.2873 | 990.94 | 1.2400 | A,D,E |
| 37 | 27.60 | 3.2290 | 1000.00 | 1.2400 | A,E,F |
| 38 | 28.25 | 3.1569 | 178.07 | 1.2400 | A,D,E,F |
| 39 | 29.95 | 2.9811 | 370.96 | 1.2400 | A,B,F |
| 40 | 30.21 | 2.9556 | 198.01 | 1.2400 | A,D,F |
| 41 | 30.88 | 2.8936 | 391.77 | 1.2400 | A,B,D,F |
| 42 | 34.15 | 2.6236 | 183.21 | 1.2400 | A,B,D,E,F |
| 43 | 34.39 | 2.6058 | 288.40 | 1.2400 | A,B,D,E,F |
| 44 | 35.07 | 2.5566 | 798.23 | 1.2400 | A,D,E,F |
| 45 | 35.26 | 2.5433 | 662.03 | 1.2400 | A,B,D |
| 46 | 35.26 | 2.5433 | 662.03 | 1.2400 | |
| 47 | 35.64 | 2.5174 | 547.51 | 1.2400 | A,D,E,F |
| 48 | 35.84 | 2.5035 | 492.25 | 1.2400 | A,E,F |
| 49 | 35.84 | 2.5035 | 492.25 | 1.2400 | |
| 50 | 36.18 | 2.4808 | 358.07 | 1.2400 | A,B,C,D,F |
| 51 | 36.18 | 2.4808 | 358.07 | 1.2400 | |
| 52 | 36.38 | 2.4678 | 320.92 | 1.2400 | A,E |
| 53 | 36.65 | 2.4503 | 305.71 | 1.2400 | A,D |
| 54 | 36.83 | 2.4384 | 288.91 | 1.2400 | A,D |
| 55 | 37.22 | 2.4140 | 386.09 | 1.2400 | A,B,D,E,F |
| 56 | 37.73 | 2.3825 | 384.15 | 1.2400 | A,B,D,E,F |
| 57 | 37.90 | 2.3720 | 369.74 | 1.2400 | A |
| 58 | 37.90 | 2.3720 | 369.74 | 1.2400 | |
| 59 | 38.03 | 2.3642 | 364.77 | 1.2400 | A |
| 60 | 38.35 | 2.3451 | 462.49 | 1.2400 | A,B,D |
| 61 | 38.56 | 2.3328 | 440.48 | 1.2400 | A,E |
| 62 | 38.90 | 2.3133 | 294.05 | 1.2400 | A,D,F |
| 63 | 38.90 | 2.3133 | 294.05 | 1.2400 | |
| 64 | 39.13 | 2.3002 | 246.83 | 1.2400 | A,B,D |
| 65 | 39.26 | 2.2928 | 236.49 | 1.2400 | A,C,D,F |
| 66 | 39.51 | 2.2787 | 203.67 | 1.2400 | A,B,D,F |
| 67 | 39.99 | 2.2525 | 206.14 | 1.2400 | A,C,D,F |
| 68 | 40.36 | 2.2332 | 230.59 | 1.2400 | A,D,E,F |
| 69 | 40.63 | 2.2188 | 195.51 | 1.2400 | A,D,E |
| 70 | 41.02 | 2.1983 | 196.34 | 1.2400 | A,D,F |
| 71 | 41.21 | 2.1889 | 186.71 | 1.2400 | A,B,D |
| 72 | 41.36 | 2.1812 | 178.70 | 1.2400 | A,B,E |
| 73 | 41.36 | 2.1812 | 178.70 | 1.2400 | |
| 74 | 41.84 | 2.1574 | 436.73 | 1.2400 | A,C,D,F |
| 75 | | | .60 | 1.2400 | A,B,D,E,F |
| 76 | | | .10 | 1.2400 | A,B,C,D,E,F |
| 77 | | | .47 | 1.2400 | A,B,D,E,F |
| 78 | | | .88 | 1.2400 | A,B,C,D,E,F |
| 79 | | | .80 | 1.2400 | B,D,E,F |
| 80 | | | .13 | 1.2400 | C,D,E,F |
| 81 | | | .80 | 1.2400 | C,D,F |
| 82 | | | .69 | 1.2400 | B,D,F |
| 83 | | | .69 | 1.2400 | |
| 84 | | | .24 | 1.2400 | B,E |
| 85 | | | .08 | 1.2400 | D,F |
| 86 | | | .08 | 1.2400 | |
| 87 | 55.79 | 1.6465 | 179.08 | 1.2400 | B,C,D,E,F |
| 88 | 60.51 | 1.5288 | 239.62 | 1.2400 | B,C,D,E,F |
| 89 | 61.68 | 1.5027 | 229.58 | 1.2400 | B,D,E,F |

| | | | | | |
|---|---|---|---|---|---|
| 90 | 62.24 | 1.4905 | 403.15 | 1.2400 | D,E,F |
| 91 | 62.53 | 1.4843 | 317.51 | 1.2400 | B,C,D,E,F |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

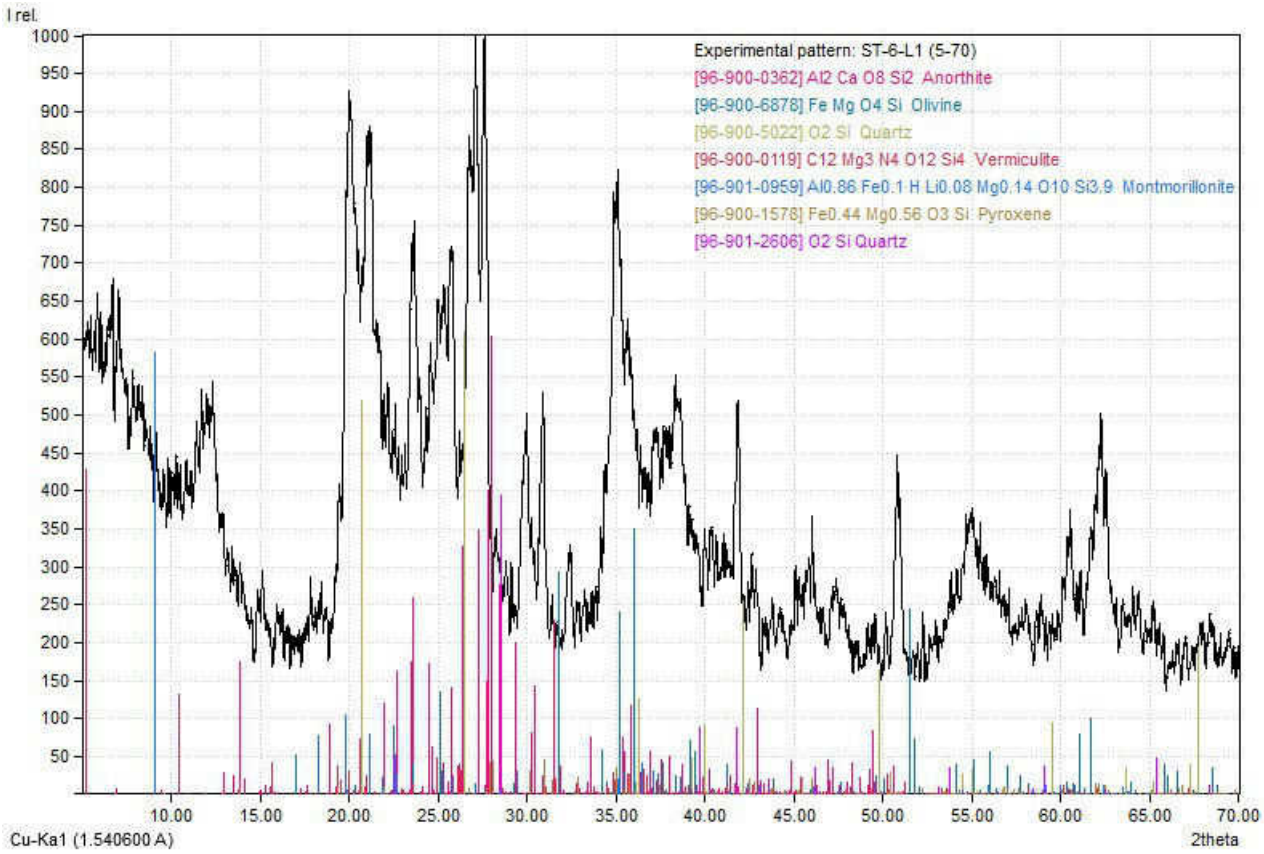
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 114888 | 100.00% |
| Background radiation | 67436 | 58.70% |
| Diffraction peaks | 47452 | 41.30% |
| Peak area belonging to selected phases | 45492 | 39.60% |
| Unidentified peak area | 1960 | 1.71% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 5837 | 100.00% |
| Peak intensity belonging to selected phases | 1959 | 33.55% |
| Unidentified peak intensity | 3879 | 66.45% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-7-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-7-L1.RAW |
| File path | D:/S2 Geologi/data hasil/XRD Bu Ulva/ST-7-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 4.940° - 69.940° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | -0.06° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 26.0 | Muscovite | Al2.038 Ba0.01 Ca0.02 Fe0.14 H2 K0.87 Mg0.5 Na0.07 O12 Si3.392 Ti0.01 |
| B | 25.6 | Anorthite | Al2 Ca O8 Si2 |
| C | 16.2 | Biotite | Al1.322 Fe0.864 K Mg1.638 O12 Si2.84 Ti0.336 |
| D | 12.7 | Olivine | Fe Mg O4 Si |
| E | 8.4 | Quartz | O2 Si |
| F | 5.3 | Pyroxene | Fe0.44 Mg0.56 O3 Si |
| G | 5.3 | Vermiculite | C12 Mg3 N4 O12 Si4 |
| H | 0.5 | Montmorillonite | Al2 Ca O12 Si4 |
| | *16.5* | *Unidentified peak area* | |

***A: Muscovite (26.0 %)***

| | |
|---|---|
| Formula sum | Al2.038 Ba0.01 Ca0.02 Fe0.14 H2 K0.87 Mg0.5 Na0.07 O12 Si3.392 Ti0.01 |
| Entry number | 96-901-6013 |
| Figure-of-Merit (FoM) | 0.854215 |
| Total number of peaks | 300 |
| Peaks in range | 172 |
| Peaks matched | 136 |
| Intensity scale factor | 0.36 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.2112 Å b= 9.0383 Å c= 19.9473 Å β= 95.769 ° |
| I/Icor | 0.75 |
| Calc. density | 2.858 g/cm³ |
| Reference | Guven N., "The crystal structures of 2M1 phengite and 2M1 muscovite Note: sample 2M1 phengite", Zeitschrift fur Kristallographie **134**, 196-212 (1971) |

***B: Anorthite (25.6 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0363 |
| Figure-of-Merit (FoM) | 0.837021 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 340 |
| Intensity scale factor | 0.28 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.2230 Å b= 12.9150 Å c= 14.2040 Å α= 92.750° β= 115.800 ° γ= 91.020 ° |
| I/Icor | 0.60 |
| Calc. density | 2.725 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 830 C", American Mineralogist **58**, 665-675 (1973) |

***C: Biotite (16.2 %)***

| | |
|---|---|
| Formula sum | Al1.322 Fe0.864 K Mg1.638 O12 Si2.84 Ti0.336 |
| Entry number | 96-900-0844 |
| Figure-of-Merit (FoM) | 0.827107 |
| Total number of peaks | 297 |
| Peaks in range | 177 |
| Peaks matched | 119 |
| Intensity scale factor | 0.46 |
| Space group | C 1 2/c 1 |
| Crysta | noclinic |
| Unit ce | 5.3175 Å b= 9.2120 Å c= 19.9760 Å β= 95.090 ° |
| I/Icor | i4 |
| Calc. d | 171 g/cm³ |
| Refere | ta T., Takeda H., Takeuchi Y., "Mica polytypism: Similarities in the crystal structures of coexisting 1M and 2M(1) oxybiotite mple: in the 2M1 setting", American Mineralogist **67**, 298-310 (1982) |



***D: Oliv***

| | |
|---|---|
| Formu | Mg O4 Si |
| Entry n | -900-6881 |
| Figure | 37179 |
| Total number of peaks | 174 |
| Peaks in range | 63 |
| Peaks matched | 42 |
| Intensity scale factor | 0.29 |

| | |
|---|---|
| Intensity scale factor | 0.29 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit cell | a= 4.8168 Å b= 10.4029 Å c= 6.0800 Å |
| I/Icor | 1.24 |
| Calc. density | 3.754 g/cm³ |
| Reference | Redfern S. A. T., Artioli G., Rinaldi R., Henderson C. M. B., Knight K. S., Wood B. J., "Octahedral cation ordering in olivine at high temperature. II: an in situ neutron powder diffraction study on synthetic MgFeSiO4 (Fa50) Sample: T = 450 C", Physics and Chemistry of Minerals **27**, 630-637 (2000) |

***E: Quartz (8.4 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-901-3322 |
| Figure-of-Merit (FoM) | 0.760559 |
| Total number of peaks | 35 |
| Peaks in range | 14 |
| Peaks matched | 14 |
| Intensity scale factor | 0.69 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.9134 Å c= 5.4051 Å |
| I/Icor | 4.74 |
| Calc. density | 2.649 g/cm³ |
| Reference | Antao S. M., Hassan I., Wang J., Lee P. L., Toby B. H., "State-of-the-art high-resolution powder x-ray diffraction (HRPXRD) illustrated with Rietveld structure refinement of quartz, sodalite, tremolite, and meionite Locality: not specified", The Canadian Mineralogist **46**, 1501-1509 (2008) |

***F: Pyroxene (5.3 %)***

| | |
|---|---|
| Formula sum | Fe0.44 Mg0.56 O3 Si |
| Entry number | 96-900-1578 |
| Figure-of-Merit (FoM) | 0.777974 |
| Total number of peaks | 437 |
| Peaks in range | 148 |
| Peaks matched | 114 |
| Intensity scale factor | 0.06 |
| Space group | P b c a |
| Crystal system | orthorhombic |
| Unit cell | a= 18.3120 Å b= 8.9170 Å c= 5.2170 Å |
| I/Icor | 0.59 |
| Calc. density | 3.564 g/cm³ |
| Reference | Hazen R. M., Finger L. W., Ko J., "Effects of pressure on Mg-Fe ordering in orthopyroxene synthesized at 11.3 GPa and 1600 C", American Mineralogist **78**, 1336-1339 (1993) |

***G: Vermiculite (5.3 %)***

| | |
|---|---|
| Formula sum | C12 Mg3 N4 O12 Si4 |
| Entry number | 96-900-0119 |
| Figure-of-Merit (FoM) | 0.789110 |
| Total number of peaks | 306 |
| Peaks in range | 167 |
| Peaks matched | 126 |
| Intensity scale factor | 0.33 |
| Space group | C 1 2 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3300 Å b= 9.1800 Å c= 17.1200 Å β= 97.000 ° |
| I/Icor | 3.46 |
| Calc. density | 2.306 g/cm³ |
| Reference | Haase D. J., Weiss E. J., Steinfink H., "The crystal structure of a hexamethylene-diamine-vermiculite complex", American Mineralogist **48**, 261-270 (1963) |

***H: Montmorillonite (0.5 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O12 Si4 |
| Entry number | 96-110-1055 |
| Figure-of-Merit (FoM) | 0.716328 |
| Total number of peaks | 92 |
| Peaks in range | 92 |
| Peaks matched | 79 |
| Intensity scale factor | 0.20 |
| Space group | P 1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 5.1800 Å b= 8.9800 Å c= 15.0000 Å α= 90.000° β= 90.000 ° γ= 90.000 ° |
| I/Icor | 20.53 |
| Calc. density | 1.800 g/cm³ |



## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-901-2602 | 0.7248 |
| Quartz | O2 Si | 96-900-5023 | 0.7047 |
| Quartz | O2 Si | 96-900-0781 | 0.6840 |
| Quartz | O2 Si | 96-901-3322 | 0.6828 |
| Quartz | O2 Si | 96-901-2601 | 0.6819 |
| Silicon | O2 Si | 96-500-0036 | 0.6814 |
| Quartz | O2 Si | 96-900-5021 | 0.6785 |
| Quartz | O2 Si | 96-900-5024 | 0.6781 |
| Quartz | O2 Si | 96-900-5025 | 0.6772 |
| Quartz | O2 Si | 96-900-5022 | 0.6757 |
| Quartz | O2 Si | 96-900-7379 | 0.6715 |
| Quartz | O2 Si | 96-901-1496 | 0.6269 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Selection Criteria

**Compound:**

***Name:*** quartz

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 5.22 | 16.9043 | 135.20 | 0.2800 | G |
| 2 | 5.64 | 15.6527 | 180.11 | 0.2800 | |
| 3 | 5.80 | 15.2254 | 138.97 | 0.2800 | |
| 4 | 5.92 | 14.9275 | 133.10 | 0.2800 | H |
| 5 | 6.09 | 14.5068 | 155.91 | 0.2800 | |
| 6 | 6.62 | 13.3369 | 228.53 | 0.2800 | |
| 7 | 6.77 | 13.0433 | 288.58 | 0.2800 | B |
| 8 | 6.98 | 12.6450 | 218.41 | 0.2800 | B |
| 9 | 7.27 | 12.1553 | 222.83 | 0.2800 | |
| 10 | 7.56 | 11.6845 | 180.16 | 0.2800 | |
| 11 | 7.93 | 11.1395 | 178.73 | 0.2800 | |
| 12 | 8.16 | 10.8256 | 194.55 | 0.2800 | |
| 13 | 8.35 | 10.5842 | 199.85 | 0.2800 | |
| 14 | 8.54 | 10.3443 | 190.84 | 0.2800 | |
| 15 | 8.79 | 10.0521 | 174.28 | 0.2800 | |
| 16 | 8.97 | 9.8537 | 188.78 | 0.2800 | A,C |
| 17 | 9.38 | 9.4180 | 155.98 | 0.2800 | B |
| 18 | 9.65 | 9.1556 | 141.54 | 0.2800 | F |
| 19 | 10.26 | 8.6167 | 138.88 | 0.2800 | B,G |
| 20 | 10.56 | 8.3687 | 138.17 | 0.2800 | |
| 21 | 10.81 | 8.1795 | 134.98 | 0.2800 | B |
| 22 | 10.97 | 8.0571 | 149.13 | 0.2800 | |
| 23 | 11.49 | 7.6980 | 211.63 | 0.2800 | |
| 24 | 12.02 | 7.3558 | 253.56 | 0.2800 | B,H |
| 25 | 12.16 | 7.2727 | 238.16 | 0.2800 | |
| 26 | 12.40 | 7.1333 | 222.38 | 0.2800 | |
| 27 | 12.58 | 7.0308 | 161.52 | 0.2800 | B |
| 28 | 13.36 | 6.6207 | 140.50 | 0.2800 | |
| 29 | 13.48 | 6.5657 | 152.37 | 0.2800 | B,F |
| 30 | 17.62 | 5.0294 | 153.28 | 0.2800 | A,B,C,H |
| 31 | 19.35 | 4.5833 | 204.43 | 0.2800 | A,B,C,F,G |
| 32 | 19.97 | 4.4424 | 489.04 | 0.2800 | A,B,C,F,G,H |
| 33 | 20.14 | 4.4055 | 394.70 | 0.2800 | A,B,C |
| 34 | 20.33 | 4.3650 | 396.48 | 0.2800 | A,B,D,F,G |
| 35 | 20.92 | 4.2439 | 723.75 | 0.2800 | A,B,C,E,G,H |
| 36 | 21.12 | 4.2032 | 614.85 | 0.2800 | C |
| 37 | 21.40 | 4.1489 | 317.87 | 0.2800 | B |
| 38 | 21.67 | 4.0980 | 285.36 | 0.2800 | A,B |
| 39 | 21.82 | 4.0698 | 257.16 | 0.2800 | B,C,F,G |
| 40 | 22.18 | 4.0038 | 250.99 | 0.2800 | B,F |
| 41 | 22.41 | 3.9634 | 310.84 | 0.2800 | A,B,D |
| 42 | 22.80 | 3.8970 | 191.83 | 0.2800 | A,B,C |
| 43 | 23.13 | 3.8426 | 250.13 | 0.2800 | B,G,H |
| 44 | 23.56 | 3.7736 | 573.78 | 0.2800 | B,C,D,G,H |
| 45 | 23.89 | 3.7213 | 245.00 | 0.2800 | A,B |
| 46 | 24.55 | 3.6229 | 339.38 | 0.2800 | B,C,F |
| 47 | 24.93 | 3.5686 | 351.76 | 0.2800 | A,B,G |
| 48 | 25.12 | 3.5429 | 375.62 | 0.2800 | B,C,D |
| 49 | 25.65 | 3.4701 | 494.39 | 0.2800 | A,B |
| 50 | 26.16 | 3.4033 | 275.11 | 0.2800 | B,C,F,G |
| 51 | 26.67 | 3.3398 | 675.53 | 0.2800 | A,B,E,F,H |
| 52 | 26.94 | 3.3065 | 700.38 | 0.2800 | A,C,G |
| 53 | 27.16 | 3.2806 | 596.01 | 0.2800 | B |
| 54 | | | .00 | 0.2800 | B,C |
| 55 | | | .75 | 0.2800 | A,B,F |
| 56 | | | .07 | 0.2800 | A,B,C,F,G |
| 57 | | | .44 | 0.2800 | B,C,D,F,H |
| 58 | | | .77 | 0.2800 | A,B,F,G |
| 59 | | | .78 | 0.2800 | A,B,C,F,G,H |
| 60 | | | .15 | 0.2800 | A,B,C,D,G |
| 61 | | | .29 | 0.2800 | A,B,C,F,G |
| 62 | | | .66 | 0.2800 | A,B,C,D,F,G |
| 63 | | | .65 | 0.2800 | A,C,D,F,G,H |
| 64 | | | .59 | 0.2800 | A,B,G |
| 65 | | | .51 | 0.2800 | A,B,D,F,H |
| 66 | 35.26 | 2.5433 | 379.91 | 0.2800 | B |
| 67 | 35.47 | 2.5287 | 342.57 | 0.2800 | B,F,G |
| 68 | 35.59 | 2.5202 | 346.23 | 0.2800 | B,F,G |

| | | | | | |
|---|---|---|---|---|---|
| 69 | 35.86 | 2.5022 | 250.70 | 0.2800 | A,B,C,F,H |
| 70 | 36.02 | 2.4914 | 221.59 | 0.2800 | A,B,C,D,F,G,H |
| 71 | 36.22 | 2.4781 | 184.01 | 0.2800 | A,B,F |
| 72 | 36.41 | 2.4656 | 193.35 | 0.2800 | A,B |
| 73 | 36.62 | 2.4520 | 209.77 | 0.2800 | A,B,E,G,H |
| 74 | 37.08 | 2.4223 | 292.97 | 0.2800 | B,C,F,G |
| 75 | 37.41 | 2.4019 | 340.21 | 0.2800 | A,B,D,F,G |
| 76 | 37.76 | 2.3805 | 235.90 | 0.2800 | A,B,F,G |
| 77 | 37.97 | 2.3675 | 252.08 | 0.2800 | B |
| 78 | 38.21 | 2.3535 | 236.78 | 0.2800 | A |
| 79 | 38.38 | 2.3435 | 207.99 | 0.2800 | B,C,D,G |
| 80 | 38.58 | 2.3317 | 251.40 | 0.2800 | B |
| 81 | 38.90 | 2.3133 | 203.00 | 0.2800 | A,B,F,G |
| 82 | 39.12 | 2.3010 | 181.60 | 0.2800 | B,C,D,G,H |
| 83 | 39.39 | 2.2855 | 141.63 | 0.2800 | B,C,D,E,F,G |
| 84 | 39.87 | 2.2590 | 132.03 | 0.2800 | A,B,C,F,G,H |
| 85 | 40.44 | 2.2285 | 139.74 | 0.2800 | A,B,C,E,F,G,H |
| 86 | 41.26 | 2.1862 | 147.58 | 0.2800 | A,B,C,D,F,G,H |
| 87 | 41.71 | 2.1635 | 449.37 | 0.2800 | A,B,C,F,G,H |
| 88 | 42.52 | 2.1242 | 139.66 | 0.2800 | A,B,C,E,F,G,H |
| 89 | 44.93 | 2.0159 | 172.26 | 0.2800 | A,B,F,G |
| 90 | 45.17 | 2.0059 | 169.30 | 0.2800 | B,F,G |
| 91 | 45.34 | 1.9986 | 138.58 | 0.2800 | A,B,F,G |
| 92 | 45.52 | 1.9910 | 156.73 | 0.2800 | C |
| 93 | 45.82 | 1.9788 | 140.43 | 0.2800 | A,B,D,E,F,G |
| 94 | 46.12 | 1.9666 | 144.68 | 0.2800 | A,B,C,F,H |
| 95 | 47.06 | 1.9294 | 157.85 | 0.2800 | A,B,F,G,H |
| 96 | 47.22 | 1.9231 | 152.00 | 0.2800 | B,C,F,H |
| 97 | 47.51 | 1.9121 | 150.04 | 0.2800 | A,B,C,D,F,G |
| 98 | 50.68 | 1.7998 | 309.83 | 0.2800 | A,B,C,E,F,G,H |
| 99 | 53.64 | 1.7074 | 135.36 | 0.2800 | A,C,F,G |
| 100 | 53.84 | 1.7015 | 174.30 | 0.2800 | A,F,G |
| 101 | 54.03 | 1.6960 | 159.03 | 0.2800 | A,C,D,F,G,H |
| 102 | 54.15 | 1.6922 | 179.02 | 0.2800 | A,C,F |
| 103 | 54.33 | 1.6872 | 178.78 | 0.2800 | A,C,F,G,H |
| 104 | 54.79 | 1.6741 | 239.37 | 0.2800 | A,C,E,F,G,H |
| 105 | 55.15 | 1.6639 | 236.90 | 0.2800 | A,C,D,F,G |
| 106 | 55.42 | 1.6567 | 147.83 | 0.2800 | A,C,D,E,F,G,H |
| 107 | 55.55 | 1.6530 | 152.71 | 0.2800 | A,G,H |
| 108 | 55.75 | 1.6476 | 159.96 | 0.2800 | A,D,F,G |
| 109 | 56.05 | 1.6395 | 187.79 | 0.2800 | A,C,G |
| 110 | 56.49 | 1.6277 | 166.39 | 0.2800 | A,C,D,F |
| 111 | 56.73 | 1.6214 | 134.27 | 0.2800 | A,C,D,E,F,G,H |
| 112 | 59.94 | 1.5419 | 149.28 | 0.2800 | A,C,D,E,F,G,H |
| 113 | 60.24 | 1.5350 | 252.59 | 0.2800 | A,C,D,F,G |
| 114 | 60.80 | 1.5222 | 138.44 | 0.2800 | A,C,D,F,G,H |
| 115 | 61.53 | 1.5060 | 157.94 | 0.2800 | A,C,D,F,G |
| 116 | 62.01 | 1.4954 | 266.59 | 0.2800 | A,F,G,H |
| 117 | 62.15 | 1.4923 | 289.14 | 0.2800 | A,F |
| 118 | 62.42 | 1.4866 | 216.67 | 0.2800 | A,C,D,F,G,H |
| 119 | 62.68 | 1.4810 | 146.90 | 0.2800 | A,C,F,G,H |
| 120 | 63.48 | 1.4643 | 132.77 | 0.2800 | A,C,D,F,G,H |
| 121 | 64.09 | 1.4518 | 173.67 | 0.2800 | A,C,D,E,F,G |
| 122 | 64.79 | 1.4377 | 131.13 | 0.2800 | A,D,F,G,H |
| 123 | 65.13 | 1.4311 | 135.01 | 0.2800 | F,H |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

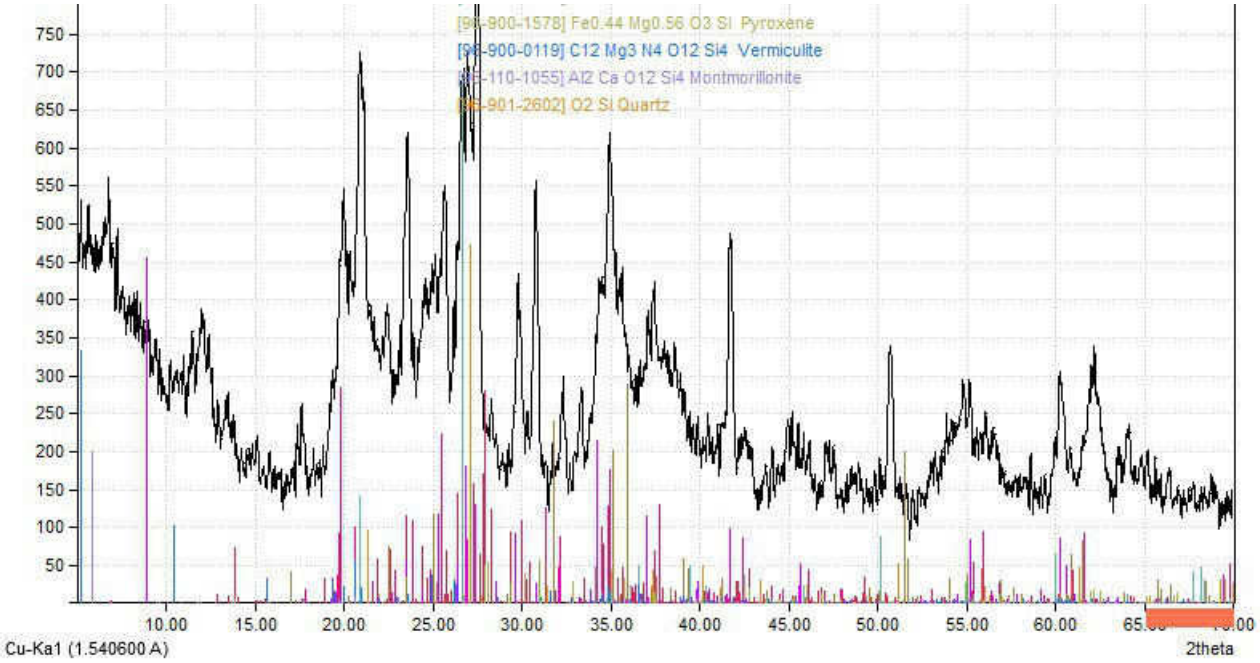
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 105586 | 100.00% |
| Background radiation | 65865 | 62.38% |
| Diffraction peaks | 39721 | 37.62% |
| Peak area belonging to selected phases | 22305 | 21.13% |
| Unidentified peak area | 17416 | 16.49% |

## Peak Residuals

| *Peak* | *Counts* | *Amount* |
|---|---|---|
| Overal | 1469 | 100.00% |
| Peak i ases | 567 | 38.62% |
| Unide | 902 | 61.38% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-8-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-8-L1.RAW |
| File path | D:/S2 Geologi/data hasil/XRD Bu Ulva/ST-8-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 5.020° - 70.020° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.02° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 44.7 | Muscovite | Al2.908 H0.12 K O10 Si3.092 |
| B | 26.8 | Anorthite | Al2 Ca O8 Si2 |
| C | 12.6 | Tridymite | O2 Si |
| D | 11.0 | Olivine | Fe Mg O4 Si |
| E | 4.6 | Hornblende | Al2.42 Ca1.83 Fe1.852 H1.34 Mg2.218 Na0.706 O24 Si6.44 Ti0.07 |
| F | 0.4 | Vermiculite | Al0.721 Fe0.24 H3 Mg1.338 O9 Si1.36 |
| | *3.9* | *Unidentified peak area* | |

***A: Muscovite (44.7 %)***

| | |
|---|---|
| Formula sum | Al2.908 H0.12 K O10 Si3.092 |
| Entry number | 96-900-1059 |
| Figure-of-Merit (FoM) | 0.757165 |
| Total number of peaks | 300 |
| Peaks in range | 300 |
| Peaks matched | 162 |
| Intensity scale factor | 0.44 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1890 Å b= 9.0040 Å c= 20.2560 Å β= 95.740 ° |
| I/Icor | 0.52 |
| Calc. density | 2.571 g/cm³ |
| Reference | Guggenheim S., Chang Y. H., Koster van Groos A. F., "Muscovite dehydroxylation: High-temperature studies Sample: T = 650 deg C, from Panasqueira, Portugal", American Mineralogist **72**, 537-550 (1987) |

***B: Anorthite (26.8 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0363 |
| Figure-of-Merit (FoM) | 0.772052 |
| Total number of peaks | 500 |
| Peaks in range | 498 |
| Peaks matched | 390 |
| Intensity scale factor | 0.30 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.2230 Å b= 12.9150 Å c= 14.2040 Å α= 92.750° β= 115.800 ° γ= 91.020 ° |
| I/Icor | 0.60 |
| Calc. density | 2.725 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 830 C", American Mineralogist **58**, 665-675 (1973) |

***C: Tridymite (12.6 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-900-6969 |
| Figure-of-Merit (FoM) | 0.820244 |
| Total number of peaks | 500 |
| Peaks in range | 499 |
| Peaks matched | 207 |
| Intensity scale factor | 0.37 |
| Space group | P 21 21 21 |
| Crystal system | orthorhombic |
| Unit cell | a= 26.1753 Å b= 4.9844 Å c= 8.2006 Å |
| I/Icor | 8 |
| Calc. d | 37 g/cm³ |
| Refere | aetsch H., "X-ray powder diffraction study on the modulated high temperature forms of SiO2 tridymite between 110 and 220 C mple: superstructure, T = 115 C Locality: synthetic", Physics and Chemistry of Minerals **28**, 313-321 (2001) |

***D: Oli***

| | |
|---|---|
| Formu | Mg O4 Si |
| Entry n | -900-6878 |
| Figure | 25974 |
| Total n | 3 |
| Peaks | 3 |
| Peaks matched | 57 |
| Intensity scale factor | 0.26 |
| Space group | P b n m |
| Crystal system | orthorhombic |

| | |
|---|---|
| Crystal system | orthorhombic |
| Unit cell | a= 4.8106 Å b= 10.3863 Å c= 6.0682 Å |
| I/Icor | 1.27 |
| Calc. density | 3.773 g/cm³ |
| Reference | Redfern S. A. T., Artioli G., Rinaldi R., Henderson C. M. B., Knight K. S., Wood B. J., "Octahedral cation ordering in olivine at high temperature. II: an in situ neutron powder diffraction study on synthetic MgFeSiO4 (Fa50) Sample: T = 300 C", Physics and Chemistry of Minerals **27**, 630-637 (2000) |

***E: Hornblende (4.6 %)***

| | |
|---|---|
| Formula sum | Al2.42 Ca1.83 Fe1.852 H1.34 Mg2.218 Na0.706 O24 Si6.44 Ti0.07 |
| Entry number | 96-900-1228 |
| Figure-of-Merit (FoM) | 0.760294 |
| Total number of peaks | 299 |
| Peaks in range | 299 |
| Peaks matched | 164 |
| Intensity scale factor | 0.08 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 9.7860 Å b= 18.0240 Å c= 5.3060 Å β= 105.090 ° |
| I/Icor | 0.97 |
| Calc. density | 3.241 g/cm³ |
| Reference | Phillips M. W., Draheim J. E., Popp R. K., Clowe C. A., Pinkerton A. A., "Effects of oxidation-dehydrogenation in tschermakitic hornblende sample H-3, after annealing at 700 C", American Mineralogist **74**, 764-773 (1989) |

***F: Vermiculite (0.4 %)***

| | |
|---|---|
| Formula sum | Al0.721 Fe0.24 H3 Mg1.338 O9 Si1.36 |
| Entry number | 96-900-0061 |
| Figure-of-Merit (FoM) | 0.742667 |
| Total number of peaks | 292 |
| Peaks in range | 291 |
| Peaks matched | 171 |
| Intensity scale factor | 0.15 |
| Space group | C 1 c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3300 Å b= 9.1800 Å c= 28.9000 Å β= 97.000 ° |
| I/Icor | 19.70 |
| Calc. density | 1.185 g/cm³ |
| Reference | Mathieson A. M., Walker G. F., "Crystal structure of magnesium-vermiculite", American Mineralogist **39**, 231-255 (1954) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Antigorite-T | Mg48 O147 Si34 | 96-901-6234 | 0.7958 |
| meta-schoepite | H16 O20 U4 | 96-210-2097 | 0.7956 |
| Metaschoepite | H34 O40 U8 | 96-901-1299 | 0.7956 |
| Metaschoepite | H32 Na1.09 O38.328 U8 | 96-901-0196 | 0.7916 |
| Metaschoepite | H34 Na0.48 O37.91 U8 | 96-901-0195 | 0.7872 |
| Metaschoepite | H34 Na0.47 O37.082 U8 | 96-901-0199 | 0.7871 |
| Metaschoepite | H34 Na1.16 O37.9 U8 | 96-901-0198 | 0.7814 |
| | Cs F30 O6 Sb Te6 | 96-432-7610 | 0.7808 |
| Porphyrazinealuminiumchloride | C16 Al Cl N16 S4 | 96-430-9965 | 0.7793 |
| Metaschoepite | H32 Na1.22 O39.09 U8 | 96-901-0197 | 0.7792 |
| Becquerelite | Ca H22 O30 U6 | 96-900-2701 | 0.7785 |
| Vandendriesscheite | H33 O48 Pb2 U10 | 96-900-1892 | 0.7774 |
| Becquerelite | Ca O30 U6 | 96-900-1111 | 0.7762 |
| Billietite | Ba O23 U6 | 96-900-1112 | 0.7739 |
| Bikitaite | Al H2 Li O6.385 Si2 | 96-900-3102 | 0.7725 |
| potassium hydroxopentafluoroarsenate | As F5 H K O | 96-200-3122 | 0.7718 |
| Schoepite | H18 O21 U4 | 96-900-4445 | 0.7701 |
| Billietite | Ba H6 O30 U6 | 96-901-0600 | 0.7692 |
| Becquerelite | Ca H22 O30 U6 | 96-901-2088 | 0.7688 |
| Fourmarierite | H10 O19 Pb U4 | 96-900-4592 | 0.7683 |
| Porphyrazinegalliumchloride | C16 Cl Ga N16 S4 | 96-430-9966 | 0.7681 |
| Dickite | Al2 H4 O9 Si2 | 96-900-0123 | 0.7681 |
| Sidwillite | H4 Mo O5 | 96-901-1123 | 0.7664 |
| | Cl F17 Sb2 | 96-431-1868 | 0.7652 |
| | Br2 F17 Sb2 | 96-431-1869 | 0.7649 |
| CuNO blue | C12 Cu N6 O7 | 96-710-1658 | 0.7649 |
| Khademite | Al F H10 O9 S | 96-900-9710 | 0.7649 |
| Tricaesium cyclo-triphosphate telluric acid hydrate | Cs3 H8 O16 P3 Te | 96-100-8369 | 0.7644 |
| Potassium aluminium silicate hydroxide * (Muscovite 2M1) | Al3 H2 K O12 Si3 | 96-101-1050 | 0.7641 |
| Potassium aluminium silicate hydroxide * (Muscovite 2M1) | Al3 H K O12 Si3 | 96-110-0014 | 0.7641 |
| Dialuminium phyllo-disilicate tetrahydroxide (Nacrite 6M) | Al2 H4 O9 Si2 | 96-101-1063 | 0.7640 |
| Gemi | As Cu H3 O5 | 96-901-6163 | 0.7635 |
| Gobbi | Al2.8 Ca0.47 H12 Na2 O22 Si5.2 | 96-900-9491 | 0.7629 |
| | B3 H3 N12 | 96-432-2188 | 0.7624 |
| Fourm | H10 O19 Pb U4 | 96-900-4591 | 0.7624 |
| Nacrit | Al2 O9 Si2 | 96-901-4064 | 0.7620 |
| Dialun | xide * (Nacrite 4M) Al2 H4 O9 Si2 | 96-101-1081 | 0.7614 |
| Dickite | Al2 H4 O9 Si2 | 96-901-3920 | 0.7612 |
| Cobalt | As Co H3 O5 | 96-901-2337 | 0.7610 |
| lanthir | H22.62 O27 U6 | 96-901-2907 | 0.7601 |
| ammo | ihydrogendiborate-monohydrogenphosphate] hemihydrate B3 H8 N O9.5 P | 96-221-6154 | 0.7595 |
| Fourm | H10 O19 Pb U4 | 96-900-4588 | 0.7595 |
| | H15 Na Ni4 O22 P4 | 96-432-3133 | 0.7592 |
| Magnesium hydrogensulfate hydrate | H4 Mg O9 S2 | 96-110-0087 | 0.7591 |
| Monoclinic titanium metaphosphate | O27 P9 Ti3 | 96-201-0156 | 0.7591 |
| Fourmarierite | H10 O19 Pb U4 | 96-900-4584 | 0.7590 |
| Fourmarierite | H10 O19 Pb U4 | 96-900-4590 | 0.7589 |

| | | | |
|---|---|---|---|
| Fourmarierite | H10 O19 Pb U4 | 96-900-4590 | 0.7589 |
| | Cr2 H8 Mg O16 U2 | 96-400-1609 | 0.7587 |
| Antigorite | H58 Mg45 O138 Si32 | 96-900-4000 | 0.7587 |
| Fourmarierite | H10 O19 Pb U4 | 96-900-4581 | 0.7583 |
| Bikitaite | Al Li O6 Si2 | 96-900-3103 | 0.7580 |
| Fourmarierite | H10 O19 Pb U4 | 96-900-4589 | 0.7579 |
| ***and 153 others...*** | | | |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 7.33 | 12.0447 | 147.58 | 0.6800 | B,C,F |
| 2 | 11.47 | 7.7109 | 158.16 | 0.6800 | B,E |
| 3 | 11.87 | 7.4476 | 215.09 | 0.6800 | B |
| 4 | 12.17 | 7.2647 | 264.72 | 0.6800 | |
| 5 | 12.36 | 7.1554 | 214.53 | 0.6800 | F |
| 6 | 12.50 | 7.0756 | 156.15 | 0.6800 | B,C |
| 7 | 19.92 | 4.4530 | 1000.00 | 0.6800 | A,B,C,E,F |
| 8 | 20.30 | 4.3708 | 703.74 | 0.6800 | A,B,C,D,F |
| 9 | 20.56 | 4.3164 | 549.47 | 0.6800 | A,B,C,F |
| 10 | 20.81 | 4.2653 | 619.08 | 0.6800 | B,C |
| 11 | 20.98 | 4.2308 | 600.47 | 0.6800 | A,F |
| 12 | 21.18 | 4.1914 | 485.07 | 0.6800 | C,E |
| 13 | 21.38 | 4.1521 | 412.80 | 0.6800 | B,F |
| 14 | 21.55 | 4.1197 | 351.00 | 0.6800 | A,B |
| 15 | 21.72 | 4.0884 | 321.08 | 0.6800 | C |
| 16 | 21.96 | 4.0443 | 291.75 | 0.6800 | B,C,E,F |
| 17 | 22.14 | 4.0118 | 265.62 | 0.6800 | B |
| 18 | 22.46 | 3.9557 | 273.36 | 0.6800 | A,B,C,D,E,F |
| 19 | 22.66 | 3.9211 | 266.66 | 0.6800 | B,C |
| 20 | 22.86 | 3.8871 | 223.54 | 0.6800 | A,E |
| 21 | 23.08 | 3.8509 | 256.61 | 0.6800 | B,C,F |
| 22 | 23.56 | 3.7735 | 358.50 | 0.6800 | B,D,F |
| 23 | 23.76 | 3.7418 | 288.10 | 0.6800 | A,B |
| 24 | 24.33 | 3.6553 | 423.37 | 0.6800 | B,E,F |
| 25 | 24.59 | 3.6180 | 401.59 | 0.6800 | B,C |
| 26 | 24.76 | 3.5925 | 388.79 | 0.6800 | A,B,F |
| 27 | 25.05 | 3.5513 | 403.59 | 0.6800 | B,C,D |
| 28 | 25.40 | 3.5041 | 408.59 | 0.6800 | A,B,F |
| 29 | 25.62 | 3.4743 | 454.40 | 0.6800 | B,C |
| 30 | 25.82 | 3.4478 | 344.76 | 0.6800 | B |
| 31 | 26.00 | 3.4237 | 274.46 | 0.6800 | B,C,E,F |
| 32 | 26.73 | 3.3325 | 946.49 | 0.6800 | A,B,E,F |
| 33 | 27.16 | 3.2806 | 376.87 | 0.6800 | B,C,E |
| 34 | 27.50 | 3.2409 | 413.60 | 0.6800 | B |
| 35 | 27.70 | 3.2179 | 303.25 | 0.6800 | A,B,C,F |
| 36 | 27.86 | 3.1998 | 211.01 | 0.6800 | B |
| 37 | 28.24 | 3.1572 | 165.17 | 0.6800 | B,C,F |
| 38 | 28.59 | 3.1200 | 148.06 | 0.6800 | A,B,E |
| 39 | 28.98 | 3.0786 | 163.55 | 0.6800 | B,C,E |
| 40 | 29.21 | 3.0553 | 169.17 | 0.6800 | B,C,D,F |
| 41 | 29.92 | 2.9843 | 167.83 | 0.6800 | A,B,C,E,F |
| 42 | 33.18 | 2.6981 | 284.88 | 0.6800 | A,B,C,D,E,F |
| 43 | 34.96 | 2.5643 | 864.73 | 0.6800 | A,B,C,D,E,F |
| 44 | 35.28 | 2.5419 | 541.42 | 0.6800 | B,D,E,F |
| 45 | 35.58 | 2.5212 | 569.23 | 0.6800 | A,B,C |
| 46 | 35.86 | 2.5022 | 378.14 | 0.6800 | B |
| 47 | 36.00 | 2.4927 | 316.70 | 0.6800 | B,C,D,F |
| 48 | 36.16 | 2.4821 | 255.73 | 0.6800 | A,B,C,E |
| 49 | 36.69 | 2.4471 | 286.39 | 0.6800 | A,B,E,F |
| 50 | 37.01 | 2.4270 | 259.23 | 0.6800 | A,B,C,E,F |
| 51 | 37.28 | 2.4100 | 238.96 | 0.6800 | B,C,D,E |
| 52 | 37.61 | 2.3895 | 324.68 | 0.6800 | A,B,C,D,E,F |
| 53 | 37.78 | 2.3795 | 311.67 | 0.6800 | A,B,C,E,F |
| 54 | | | .26 | 0.6800 | A,B,C,E |
| 55 | | | .79 | 0.6800 | B,C,D |
| 56 | | | .51 | 0.6800 | A,B,E,F |
| 57 | | | .64 | 0.6800 | B,C,E |
| 58 | | | .72 | 0.6800 | B,C,D,E,F |
| 59 | | | .47 | 0.6800 | A,B,C,D,E,F |
| 60 | | | .33 | 0.6800 | A,B,C,E,F |
| 61 | | | .98 | 0.6800 | A,B,C,D,F |
| 62 | | | .54 | 0.6800 | A,B,C,E,F |
| 63 | | | .65 | 0.6800 | A,B,C,E,F |
| 64 | | | .30 | 0.6800 | A,B,C,D,E,F |
| 65 | 49.05 | 1.8659 | 146.02 | 0.6800 | A,B,C,D,E,F |
| 66 | 49.42 | 1.8428 | 148.62 | 0.6800 | A,B,C,D,E,F |
| 67 | 50.76 | 1.7972 | 159.92 | 0.6800 | A,B,C,D,E,F |
| 68 | 54.19 | 1.6929 | 219.53 | 0.6800 | A,C,D,E,F |

| | | | | | |
|---|---|---|---|---|---|
| 68 | 54.10 | 1.6939 | 319.52 | 0.6800 | A,C,D,E,F |
| 69 | 54.40 | 1.6852 | 197.72 | 0.6800 | A,C,E,F |
| 70 | 54.90 | 1.6709 | 280.24 | 0.6800 | A,C,E,F |
| 71 | 55.02 | 1.6677 | 271.24 | 0.6800 | A,F |
| 72 | 55.19 | 1.6630 | 265.72 | 0.6800 | A,D |
| 73 | 55.37 | 1.6580 | 279.05 | 0.6800 | A,C,D,F |
| 74 | 55.74 | 1.6479 | 221.26 | 0.6800 | A,C,E,F |
| 75 | 56.01 | 1.6404 | 221.14 | 0.6800 | A,C,D,E,F |
| 76 | 56.27 | 1.6336 | 206.01 | 0.6800 | A,C,E |
| 77 | 56.46 | 1.6285 | 174.82 | 0.6800 | A,C,D,E |
| 78 | 56.61 | 1.6244 | 176.17 | 0.6800 | C,F |
| 79 | 56.82 | 1.6190 | 144.25 | 0.6800 | A,C,D,E,F |
| 80 | 57.22 | 1.6087 | 148.85 | 0.6800 | A,C,D,E,F |
| 81 | 60.10 | 1.5383 | 160.33 | 0.6800 | A,C,D,E,F |
| 82 | 62.02 | 1.4951 | 431.24 | 0.6800 | A,C,D,E,F |
| 83 | 62.40 | 1.4870 | 492.18 | 0.6800 | A,C,D,E,F |
| 84 | 62.62 | 1.4823 | 339.46 | 0.6800 | A,C,D,E,F |
| 85 | 62.74 | 1.4797 | 269.32 | 0.6800 | A,C,E,F |
| 86 | 64.06 | 1.4524 | 177.10 | 0.6800 | A,C,D,E,F |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

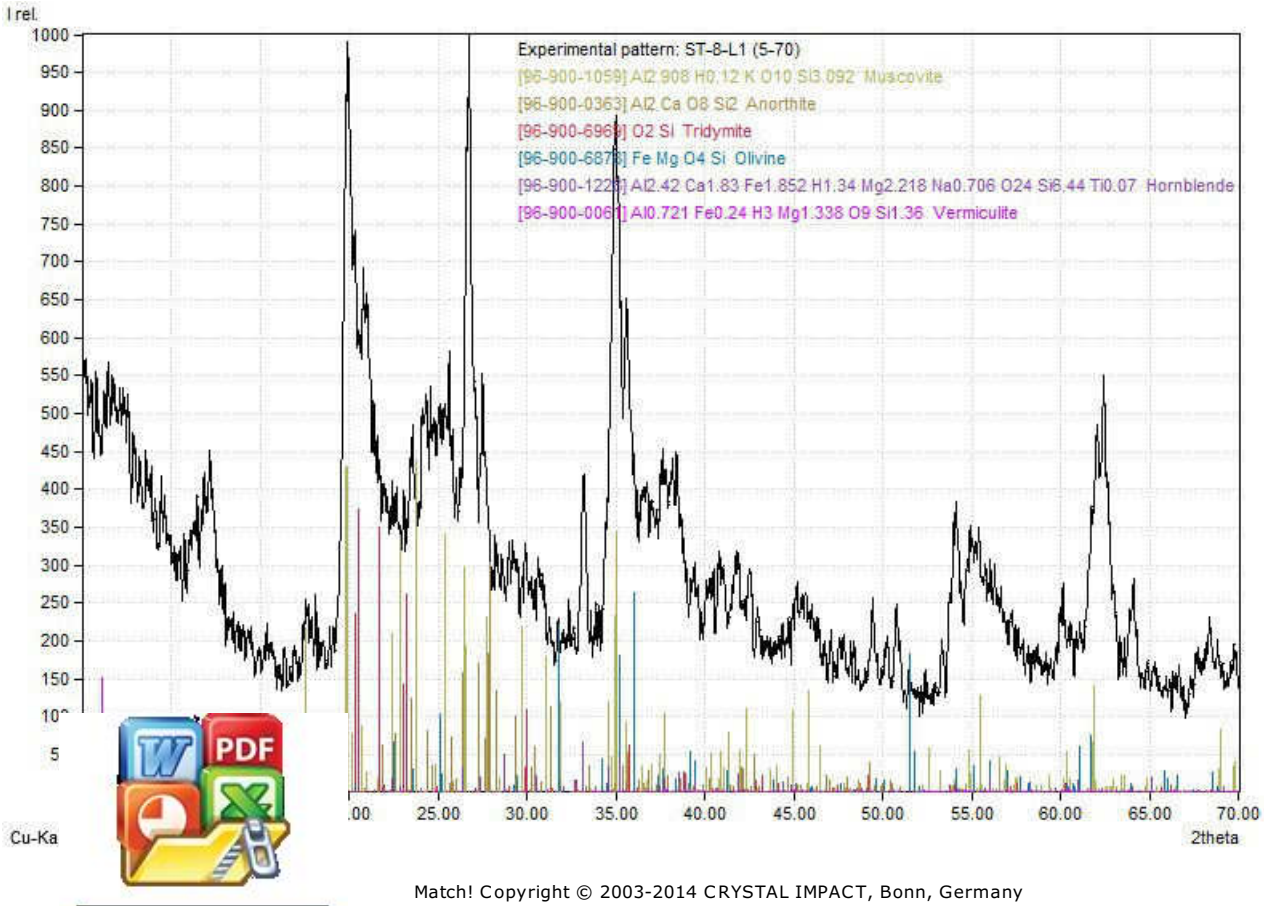
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 113138 | 100.00% |
| Background radiation | 69300 | 61.25% |
| Diffraction peaks | 43837 | 38.75% |
| Peak area belonging to selected phases | 39447 | 34.87% |
| Unidentified peak area | 4390 | 3.88% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 2950 | 100.00% |
| Peak intensity belonging to selected phases | 1621 | 54.95% |
| Unidentified peak intensity | 1329 | 45.05% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-9-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-9-L1.RAW |
| File path | D:/S2 Geologi/data hasil/XRD Bu Ulva/ST-9-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 5.110° - 70.110° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | 0.11° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 43.2 | Anorthite | Al1.911 Ca0.716 Mn0.196 Na0.045 O8 Si2.089 |
| B | 42.8 | Muscovite | Al3 K O12 Si3 |
| C | 5.9 | Olivine | Fe Mg O4 Si |
| D | 4.3 | Vermiculite | C12 Mg3 N4 O12 Si4 |
| E | 2.0 | Quartz | O2 Si |
| F | 1.6 | Montmorillonite | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| | *0.9* | *Unidentified peak area* | |

***A: Anorthite (43.2 %)***

| | |
|---|---|
| Formula sum | Al1.911 Ca0.716 Mn0.196 Na0.045 O8 Si2.089 |
| Entry number | 96-900-5310 |
| Figure-of-Merit (FoM) | 0.815525 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 202 |
| Intensity scale factor | 0.55 |
| Space group | C -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1310 Å b= 12.8470 Å c= 7.0690 Å α= 94.030° β= 115.900 ° γ= 90.720 ° |
| I/Icor | 0.62 |
| Calc. density | 2.797 g/cm³ |
| Reference | Matsui T., Kimata M., "Crystal chemistry of synthetic Mn-bearing anorthite: Incorporation of MnAl2Si2O8 end-member into feldspar Note: U(1,1) for Obo altered to reproduce Uiso", European Journal of Mineralogy **9**, 333-344 (1997) |

***B: Muscovite (42.8 %)***

| | |
|---|---|
| Formula sum | Al3 K O12 Si3 |
| Entry number | 96-901-5624 |
| Figure-of-Merit (FoM) | 0.739222 |
| Total number of peaks | 300 |
| Peaks in range | 300 |
| Peaks matched | 155 |
| Intensity scale factor | 0.37 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1890 Å b= 8.9950 Å c= 20.0970 Å β= 95.180 ° |
| I/Icor | 0.42 |
| Calc. density | 2.818 g/cm³ |
| Reference | Gatineau L., "Localisation des remplacements isomorphiques dans la muscovite Note: polytype Muscovite 2M1 _cod_database_code 1000042", Comptes Rendus Hebdomadaires des Seances de l **256**, 4648-4649 (1963) |

***C: Olivine (5.9 %)***

| | |
|---|---|
| Formula sum | Fe Mg O4 Si |
| Entry number | 96-900-6881 |
| Figure-of-Merit (FoM) | 0.707344 |
| Total number of peaks | 174 |
| Peaks in range | 174 |
| Peaks matched | 55 |
| Intensity scale factor | 0.15 |
| Space group | P b n m |
| Crystal system | orthorhombic |
| Unit ce | 4.8168 Å b= 10.4029 Å c= 6.0800 Å |
| I/Icor | 4 |
| Calc. d | 54 g/cm³ |
| Refere | dfern S. A. T., Artioli G., Rinaldi R., Henderson C. M. B., Knight K. S., Wood B. J., "Octahedral cation ordering in olivine at high nperature. II: an in situ neutron powder diffraction study on synthetic MgFeSiO4 (Fa50) Sample: T = 450 C", Physics and emistry of Minerals **27**, 630-637 (2000) |

***D: Ver***

| | |
|---|---|
| Formu | 2 Mg3 N4 O12 Si4 |
| Entry n | -900-0119 |
| Figure | 66380 |
| Total number of peaks | 306 |
| Peaks in range | 305 |
| Peaks matched | 145 |
| Intensity scale factor | 0.21 |

| | |
|---|---|
| Intensity scale factor | 0.31 |
| Space group | C 1 2 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3300 Å b= 9.1800 Å c= 17.1200 Å β= 97.000 ° |
| I/Icor | 3.46 |
| Calc. density | 2.306 g/cm³ |
| Reference | Haase D. J., Weiss E. J., Steinfink H., "The crystal structure of a hexamethylene-diamine-vermiculite complex", American Mineralogist **48**, 261-270 (1963) |

***E: Quartz (2.0 %)***

| | |
|---|---|
| Formula sum | O2 Si |
| Entry number | 96-901-5023 |
| Figure-of-Merit (FoM) | 0.687666 |
| Total number of peaks | 35 |
| Peaks in range | 35 |
| Peaks matched | 13 |
| Intensity scale factor | 0.12 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.9290 Å c= 5.3190 Å |
| I/Icor | 2.83 |
| Calc. density | 2.673 g/cm³ |
| Reference | Gibbs G. V., Boisen M. B., Downs R. T., Lasaga A. C., "Mathematical Modeling of the structures and bulk moduli of TX2 quartz and cristobalite structure types, T = C, Si, Ge and X = O, S", Materials Research Society Symposia Proceedings **121**, 155-165 (1988) |

***F: Montmorillonite (1.6 %)***

| | |
|---|---|
| Formula sum | Al0.86 Fe0.1 H Li0.08 Mg0.14 O10 Si3.9 |
| Entry number | 96-901-0959 |
| Figure-of-Merit (FoM) | 0.729550 |
| Total number of peaks | 251 |
| Peaks in range | 251 |
| Peaks matched | 82 |
| Intensity scale factor | 0.19 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1710 Å b= 8.9570 Å c= 9.7400 Å β= 96.100 ° |
| I/Icor | 5.89 |
| Calc. density | 2.245 g/cm³ |
| Reference | Gournis D., Lappas A., Karakassides M. A., Tobbens D., Moukarika A., "A neutron diffraction study of alkali cation migration in montmorillonites Sample: Li-mont-300", Physics and Chemistry of Minerals **35**, 49-58 (2008) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-900-7379 | 0.6595 |
| Quartz | O2 Si | 96-901-5023 | 0.6564 |
| Quartz | O2 Si | 96-901-2603 | 0.6563 |
| Quartz | O2 Si | 96-900-5025 | 0.6540 |
| Quartz | O2 Si | 96-900-5022 | 0.6521 |
| Quartz | O2 Si | 96-900-5023 | 0.6518 |
| Quartz | O2 Si | 96-900-5021 | 0.6463 |
| Quartz | O2 Si | 96-900-5024 | 0.6462 |
| Quartz | O2 Si | 96-901-0145 | 0.6384 |
| Quartz | O2 Si | 96-901-1494 | 0.6384 |
| Quartz | O2 Si | 96-900-5020 | 0.6336 |
| Quartz | O2 Si | 96-901-2604 | 0.6330 |
| Quartz | O2 Si | 96-900-0777 | 0.6325 |
| Quartz | O2 Si | 96-900-5018 | 0.6317 |
| Quartz | O2 Si | 96-900-5019 | 0.6317 |
| Quartz | O2 Si | 96-900-0776 | 0.6314 |
| Quartz | O2 Si | 96-901-0147 | 0.6309 |
| Quartz | O2 Si | 96-901-0146 | 0.6283 |
| Quartz | O2 Si | 96-901-2605 | 0.6169 |
| Quartz | O2 Si | 96-901-2606 | 0.6124 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Param | 0.50 |
| Param | 0 |

## Selection Criteria

**Compo**

***Name*** Quartz



## Peak List

| *No.* | | | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 6.08 | 14.5268 | 177.08 | 1.2400 | D |
| 2 | 6.21 | 14.2267 | 188.93 | 1.2400 | |
| 3 | 6.74 | 13.1056 | 213.63 | 1.2400 | |

| | | | | | |
|---|---|---|---|---|---|
| 4 | 7.07 | 12.4931 | 255.81 | 1.2400 | B,F |
| 5 | 12.34 | 7.1649 | 170.69 | 1.2400 | A,D |
| 6 | 19.91 | 4.4558 | 929.05 | 1.2400 | A,B,D,F |
| 7 | 20.11 | 4.4120 | 800.77 | 1.2400 | D |
| 8 | 20.27 | 4.3775 | 715.78 | 1.2400 | B,C |
| 9 | 20.46 | 4.3373 | 614.99 | 1.2400 | A |
| 10 | 20.65 | 4.2978 | 554.74 | 1.2400 | B,D,E |
| 11 | 21.07 | 4.2126 | 711.02 | 1.2400 | D,F |
| 12 | 21.27 | 4.1739 | 628.86 | 1.2400 | |
| 13 | 21.45 | 4.1393 | 536.86 | 1.2400 | |
| 14 | 21.61 | 4.1090 | 471.35 | 1.2400 | B |
| 15 | 21.92 | 4.0515 | 373.35 | 1.2400 | D,F |
| 16 | 22.16 | 4.0077 | 328.83 | 1.2400 | A |
| 17 | 22.37 | 3.9706 | 309.02 | 1.2400 | B |
| 18 | 22.57 | 3.9366 | 375.13 | 1.2400 | C |
| 19 | 22.76 | 3.9038 | 370.39 | 1.2400 | A,F |
| 20 | 23.15 | 3.8386 | 289.77 | 1.2400 | B,D |
| 21 | 23.64 | 3.7605 | 767.99 | 1.2400 | A,C,D |
| 22 | 23.89 | 3.7217 | 433.06 | 1.2400 | A,B |
| 23 | 24.08 | 3.6930 | 326.45 | 1.2400 | |
| 24 | 24.35 | 3.6532 | 436.50 | 1.2400 | A |
| 25 | 24.70 | 3.6018 | 436.58 | 1.2400 | A,B |
| 26 | 24.98 | 3.5612 | 354.42 | 1.2400 | C,D |
| 27 | 25.43 | 3.5002 | 530.88 | 1.2400 | A,B |
| 28 | 25.79 | 3.4522 | 586.60 | 1.2400 | A,F |
| 29 | 26.23 | 3.3943 | 329.45 | 1.2400 | A,D |
| 30 | 26.96 | 3.3042 | 949.53 | 1.2400 | A,B,D,E,F |
| 31 | 27.48 | 3.2432 | 1000.00 | 1.2400 | A |
| 32 | 27.65 | 3.2236 | 957.25 | 1.2400 | B,F |
| 33 | 27.83 | 3.2031 | 759.14 | 1.2400 | A |
| 34 | 28.44 | 3.1356 | 234.99 | 1.2400 | A,F |
| 35 | 28.70 | 3.1077 | 206.26 | 1.2400 | A,B,D |
| 36 | 29.02 | 3.0741 | 257.11 | 1.2400 | |
| 37 | 29.17 | 3.0590 | 193.97 | 1.2400 | A,C |
| 38 | 29.95 | 2.9814 | 466.45 | 1.2400 | B,D |
| 39 | 30.36 | 2.9414 | 239.83 | 1.2400 | A |
| 40 | 30.92 | 2.8901 | 301.36 | 1.2400 | A |
| 41 | 31.11 | 2.8725 | 176.71 | 1.2400 | A,B,C,D,F |
| 42 | 34.95 | 2.5653 | 892.57 | 1.2400 | A,B,C,D,F |
| 43 | 35.19 | 2.5483 | 977.11 | 1.2400 | A,B,C,D,F |
| 44 | 35.66 | 2.5154 | 576.14 | 1.2400 | A,D,F |
| 45 | 35.97 | 2.4948 | 367.97 | 1.2400 | A,B,C |
| 46 | 36.15 | 2.4830 | 334.55 | 1.2400 | A,B,D |
| 47 | 36.35 | 2.4695 | 269.24 | 1.2400 | A,E |
| 48 | 36.55 | 2.4565 | 247.29 | 1.2400 | A,B,D,F |
| 49 | 36.95 | 2.4307 | 278.37 | 1.2400 | A,D |
| 50 | 37.23 | 2.4133 | 286.22 | 1.2400 | A,B,C,D,F |
| 51 | 37.43 | 2.4008 | 340.95 | 1.2400 | |
| 52 | 37.72 | 2.3828 | 375.55 | 1.2400 | A,B,C,D,F |
| 53 | 37.94 | 2.3699 | 337.79 | 1.2400 | A |
| 54 | 38.32 | 2.3473 | 276.30 | 1.2400 | A,B,C,D |
| 55 | 38.84 | 2.3166 | 245.37 | 1.2400 | A,B,C,D,F |
| 56 | 39.85 | 2.2606 | 165.73 | 1.2400 | A,B,D,E |
| 57 | 40.88 | 2.2055 | 182.31 | 1.2400 | A,B,D,F |
| 58 | 41.05 | 2.1971 | 182.14 | 1.2400 | B,C,D,F |
| 59 | 41.81 | 2.1590 | 337.03 | 1.2400 | A,B,C,D,E,F |
| 60 | 50.94 | 1.7912 | 251.80 | 1.2400 | A,B,C,D,E,F |
| 61 | 54.07 | 1.6947 | 246.21 | 1.2400 | A,B,C,D,F |
| 62 | 54.38 | 1.6858 | 185.36 | 1.2400 | A,B,D,F |
| 63 | 55.11 | 1.6653 | 273.20 | 1.2400 | A,B,C,D,E |
| 64 | 55.32 | 1.6592 | 244.88 | 1.2400 | A,B,C,D,F |
| 65 | 55.57 | 1.6524 | 204.16 | 1.2400 | B,D |
| 66 | 55.83 | 1.6453 | 252.25 | 1.2400 | B,C,D,F |
| 67 | 56.00 | 1.6406 | 258.16 | 1.2400 | A,B,D,E |
| 68 | 56.29 | 1.6330 | 198.61 | 1.2400 | A,B,C,D,F |
| 69 | 56.61 | 1.6246 | 219.65 | 1.2400 | A,B,D |
| 70 | 56.83 | 1.6187 | 198.85 | 1.2400 | A,B,C,D,E,F |
| 71 | 60.56 | 1.5278 | 168.21 | 1.2400 | A,B,C,D,E,F |
| 72 | 60.75 | 1.5233 | 172.61 | 1.2400 | A,B,C,D,F |
| 73 | 61.16 | 1.5141 | 208.19 | 1.2400 | A,B,C,D,F |
| 74 | 61.58 | 1.5048 | 342.12 | 1.2400 | A,C,D |
| 75 | 61.76 | 1.5009 | 341.86 | 1.2400 | A,B |
| 76 | 61.94 | 1.4969 | 362.23 | 1.2400 | A,B,D |
| 77 | | | .25 | 1.2400 | A,B,D,F |
| 78 | | | .45 | 1.2400 | A,B,F |
| 79 | | | .76 | 1.2400 | A,C,D,F |
| 80 | | | .90 | 1.2400 | A,B,D |
| 81 | | | .54 | 1.2400 | A,B,D,F |
| 82 | | | .50 | 1.2400 | A,B,C,D,E,F |



## Rietveld Refinement using FullProf

Calcul erge.

## Integrated Profile Areas

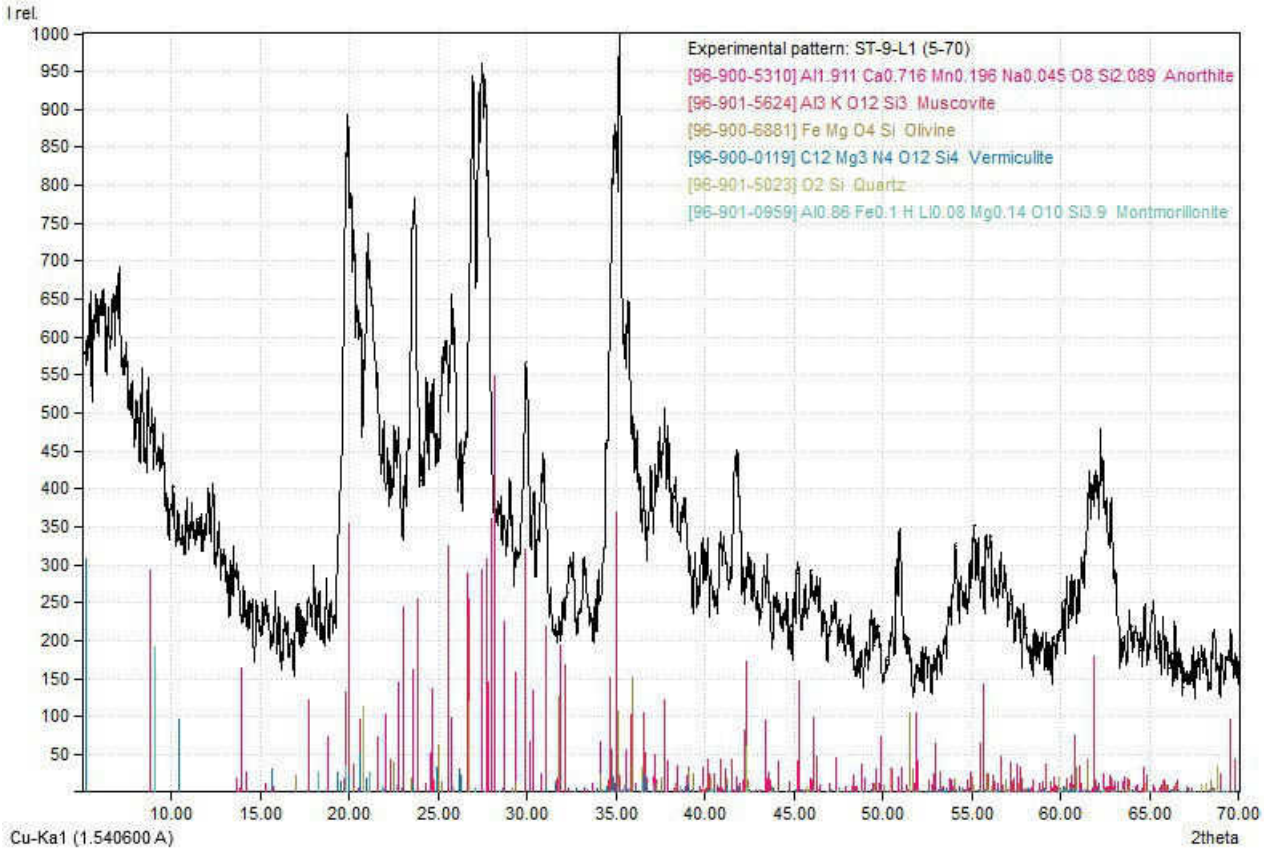
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 163805 | 100.00% |
| Background radiation | 100675 | 61.46% |
| Diffraction peaks | 63130 | 38.54% |
| Peak area belonging to selected phases | 61658 | 37.64% |
| Unidentified peak area | 1472 | 0.90% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 6312 | 100.00% |
| Peak intensity belonging to selected phases | 3143 | 49.80% |
| Unidentified peak intensity | 3169 | 50.20% |

## Diffraction Pattern Graphics



# Match! Phase Analysis Report

## Sample: ST-10-L1 (5-70)

***Sample Data***

| | |
|---|---|
| File name | ST-10-L1.RAW |
| File path | D:/S2 Geologi/data hasil/XRD Bu Ulva/ST-10-L1 |
| Data collected | Jan 5, 2024 16:52:42 |
| Data range | 4.950° - 69.950° |
| Number of points | 3251 |
| Step size | 0.020 |
| Rietveld refinement converged | No |
| Alpha2 subtracted | No |
| Background subtr. | No |
| Data smoothed | Yes |
| 2theta correction | -0.05° |
| Radiation | X-rays |
| Wavelength | 1.540600 Å |

## Matched Phases

| *Index* | *Amount (%)* | *Name* | *Formula sum* |
|---|---|---|---|
| A | 39.8 | Muscovite | Al3 H2 K O12 Si3 |
| B | 33.6 | Anorthite | Al2 Ca O8 Si2 |
| C | 10.9 | Olivine | Fe Mg O4 Si |
| D | 7.7 | Quartz | O2 Si |
| E | 6.9 | Biotite | Al Fe H2 K Mg2 O12 Si3 |
| F | 0.6 | Montmorillonite | Al2 Ca O12 Si4 |
| G | 0.6 | Vermiculite | H2 Mg3 O12 Si4 |
| | *5.9* | *Unidentified peak area* | |

***A: Muscovite (39.8 %)***

| | |
|---|---|
| Formula sum | Al3 H2 K O12 Si3 |
| Entry number | 96-900-0838 |
| Figure-of-Merit (FoM) | 0.801323 |
| Total number of peaks | 300 |
| Peaks in range | 300 |
| Peaks matched | 168 |
| Intensity scale factor | 0.38 |
| Space group | C 1 2/c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.1988 Å b= 9.0266 Å c= 20.1058 Å β= 95.782 ° |
| I/Icor | 0.41 |
| Calc. density | 2.818 g/cm³ |
| Reference | Richardson S. M., Richardson J. W., "Crystal structure of a pink muscovite from Archer's Post, Kenya: Implications for reverse pleochroism in dioctahedral micas", American Mineralogist **67**, 69-75 (1982) |

***B: Anorthite (33.6 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O8 Si2 |
| Entry number | 96-900-0362 |
| Figure-of-Merit (FoM) | 0.856007 |
| Total number of peaks | 500 |
| Peaks in range | 500 |
| Peaks matched | 422 |
| Intensity scale factor | 0.48 |
| Space group | P -1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 8.1940 Å b= 12.8970 Å c= 14.1900 Å α= 92.980° β= 115.820 ° γ= 91.150 ° |
| I/Icor | 0.60 |
| Calc. density | 2.745 g/cm³ |
| Reference | Foit F. F., Peacor D. R., "The anorthite crystal structure at 410 and 830 C T = 410 C", American Mineralogist **58**, 665-675 (1973) |

***C: Olivine (10.9 %)***

| | |
|---|---|
| Formula sum | Fe Mg O4 Si |
| Entry number | 96-900-6893 |
| Figure-of-Merit (FoM) | 0.758596 |
| Total number of peaks | 177 |
| Peaks in range | 177 |
| Peaks matched | 61 |
| Intensity scale factor | 0.28 |
| Space group | P b n m |
| Crysta[illegible] | orthorhombic |
| Unit ce[illegible] | 4.8497 Å b= 10.5034 Å c= 6.1418 Å |
| I/Icor | 8 |
| Calc. d[illegible] | 57 g/cm³ |
| Refere[illegible] | dfern S. A. T., Artioli G., Rinaldi R., Henderson C. M. B., Knight K. S., Wood B. J., "Octahedral cation ordering in olivine at high nperature. II: an in situ neutron powder diffraction study on synthetic MgFeSiO4 (Fa50) Sample: T = 1250 C", Physics and emistry of Minerals **27**, 630-637 (2000) |

***D: Qu[illegible]***

| | |
|---|---|
| Formu[illegible] | Si |
| Entry n[illegible] | -900-0778 |
| Figure[illegible] | 10301 |
| Total number of peaks | 34 |
| Peaks in range | 34 |
| Peaks matched | 13 |
| Intensity scale factor | 0.49 |

| | |
|---|---|
| Intensity scale factor | 0.49 |
| Space group | P 32 2 1 |
| Crystal system | trigonal (hexagonal axes) |
| Unit cell | a= 4.7736 Å c= 5.3010 Å |
| I/Icor | 2.70 |
| Calc. density | 2.861 g/cm³ |
| Reference | Levien L., Prewitt C. T., Weidner D. J., "Structure and elastic properties of quartz at pressure P = 37.6 kbar", American Mineralogist **65**, 920-930 (1980) |

***E: Biotite (6.9 %)***

| | |
|---|---|
| Formula sum | Al Fe H2 K Mg2 O12 Si3 |
| Entry number | 96-900-1266 |
| Figure-of-Merit (FoM) | 0.767219 |
| Total number of peaks | 279 |
| Peaks in range | 279 |
| Peaks matched | 95 |
| Intensity scale factor | 0.28 |
| Space group | C 1 2/m 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3460 Å b= 9.2520 Å c= 10.2380 Å β= 100.020 ° |
| I/Icor | 1.74 |
| Calc. density | 2.987 g/cm³ |
| Reference | Brigatti M. F., Davoli P., "Crystal-structure refinement of 1M plutonic biotites sample M32 from a syenite in the Valle del Cervo pluton", American Mineralogist **75**, 305-313 (1990) |

***F: Montmorillonite (0.6 %)***

| | |
|---|---|
| Formula sum | Al2 Ca O12 Si4 |
| Entry number | 96-110-1055 |
| Figure-of-Merit (FoM) | 0.731583 |
| Total number of peaks | 92 |
| Peaks in range | 92 |
| Peaks matched | 87 |
| Intensity scale factor | 0.28 |
| Space group | P 1 |
| Crystal system | triclinic (anorthic) |
| Unit cell | a= 5.1800 Å b= 8.9800 Å c= 15.0000 Å α= 90.000° β= 90.000 ° γ= 90.000 ° |
| I/Icor | 20.53 |
| Calc. density | 1.800 g/cm³ |

***G: Vermiculite (0.6 %)***

| | |
|---|---|
| Formula sum | H2 Mg3 O12 Si4 |
| Entry number | 96-900-0010 |
| Figure-of-Merit (FoM) | 0.780436 |
| Total number of peaks | 262 |
| Peaks in range | 262 |
| Peaks matched | 160 |
| Intensity scale factor | 0.31 |
| Space group | C 1 c 1 |
| Crystal system | monoclinic |
| Unit cell | a= 5.3100 Å b= 9.2000 Å c= 28.4600 Å β= 97.140 ° |
| I/Icor | 23.48 |
| Calc. density | 1.826 g/cm³ |
| Reference | Gruner J. W., "The structures of vermiculites and their collapse by dehydration Locality: Structure results from data of many samples", American Mineralogist **19**, 557-575 (1934) |

## Candidates

| *Name* | *Formula* | *Entry No.* | *FoM* |
|---|---|---|---|
| Quartz | O2 Si | 96-900-0776 | 0.7137 |
| Quartz | O2 Si | 96-900-0777 | 0.6433 |
| Quartz | O2 Si | 96-900-0778 | 0.6698 |
| Quartz | O2 Si | 96-900-0779 | 0.7095 |
| Quartz | O2 Si | 96-900-0780 | 0.7092 |
| Quartz | O2 Si | 96-900-0781 | 0.6925 |
| Quartz | O2 Si | 96-900-5018 | 0.7126 |
| Quartz | O2 Si | 96-900-5019 | 0.6984 |
| Quartz | O2 Si | 96-900-5020 | 0.6946 |
| Quartz | O2 Si | 96-900-5021 | 0.6942 |
| Quartz | O2 Si | 96-900-5022 | 0.6785 |
| Quartz | O2 Si | 96-900-5023 | 0.7058 |
| Quartz | O2 Si | 96-900-5024 | 0.6983 |
| Quartz | O2 Si | 96-900-5025 | 0.7118 |
| Quartz | O2 Si | 96-900-7379 | 0.7217 |
| Quartz | O2 Si | 96-900-9667 | 0.7081 |
| Quartz | O2 Si | 96-901-0145 | 0.7090 |
| Quartz | O2 Si | 96-901-0146 | 0.7008 |
| Quartz | O2 Si | 96-901-0147 | 0.6971 |
| Quartz | O2 Si | 96-901-1494 | 0.6865 |
| Quartz | O2 Si | 96-901-1495 | 0.6770 |
| Quartz | O2 Si | 96-901-1496 | 0.6754 |
| Quartz | O2 Si | 96-901-1497 | 0.6109 |
| Quartz | O2 Si | 96-901-2601 | 0.7126 |
| Quartz | O2 Si | 96-901-2602 | 0.6917 |
| Quartz | O2 Si | 96-901-2603 | 0.6680 |
| Quartz | O2 Si | 96-901-2604 | 0.6741 |
| Quartz | O2 Si | 96-901-2605 | 0.6456 |
| Quartz | O2 Si | 96-901-2606 | 0.6306 |
| Quartz | O2 Si | 96-901-3322 | 0.7129 |

| | | | |
|---|---|---|---|
| Quartz | O2 Si | 96-901-5023 | 0.7414 |
| Silicon oxide (Quartz) | O2 Si | 96-500-0036 | 0.7131 |

## Search-Match

***Settings***

| | |
|---|---|
| Reference database used | COD-Inorg REV89244 2013.10.11 |
| Automatic zeropoint adaptation | Yes |
| Minimum figure-of-merit (FoM) | 0.60 |
| Parameter/influence 2theta | 0.50 |
| Parameter/influence intensities | 0.50 |
| Parameter multiple/single phase(s) | 0.50 |

## Selection Criteria

**Compound:**

***Name:*** quartz

## Peak List

| *No.* | *2theta [°]* | *d [Å]* | *I/I0* | *FWHM* | *Matched* |
|---|---|---|---|---|---|
| 1 | 5.07 | 17.4229 | 168.21 | 0.5600 | |
| 2 | 5.28 | 16.7106 | 242.33 | 0.5600 | |
| 3 | 5.56 | 15.8915 | 195.80 | 0.5600 | |
| 4 | 5.70 | 15.4986 | 181.26 | 0.5600 | F |
| 5 | 6.12 | 14.4295 | 242.31 | 0.5600 | G |
| 6 | 6.39 | 13.8205 | 277.01 | 0.5600 | |
| 7 | 6.54 | 13.4958 | 247.34 | 0.5600 | |
| 8 | 6.84 | 12.9213 | 271.54 | 0.5600 | B |
| 9 | 7.19 | 12.2803 | 242.87 | 0.5600 | |
| 10 | 7.33 | 12.0505 | 241.40 | 0.5600 | |
| 11 | 7.50 | 11.7778 | 242.37 | 0.5600 | |
| 12 | 7.85 | 11.2467 | 222.37 | 0.5600 | |
| 13 | 8.12 | 10.8831 | 190.10 | 0.5600 | |
| 14 | 8.53 | 10.3627 | 190.95 | 0.5600 | |
| 15 | 8.65 | 10.2171 | 190.46 | 0.5600 | |
| 16 | 8.88 | 9.9539 | 201.22 | 0.5600 | A,E |
| 17 | 9.28 | 9.5260 | 182.00 | 0.5600 | B |
| 18 | 10.59 | 8.3497 | 198.38 | 0.5600 | B |
| 19 | 10.78 | 8.1973 | 243.44 | 0.5600 | B |
| 20 | 11.19 | 7.9013 | 190.20 | 0.5600 | |
| 21 | 11.64 | 7.5958 | 283.01 | 0.5600 | |
| 22 | 11.85 | 7.4607 | 334.04 | 0.5600 | F |
| 23 | 12.06 | 7.3320 | 367.92 | 0.5600 | B |
| 24 | 12.27 | 7.2077 | 293.10 | 0.5600 | |
| 25 | 12.46 | 7.1006 | 269.91 | 0.5600 | G |
| 26 | 12.69 | 6.9701 | 212.05 | 0.5600 | B |
| 27 | 13.65 | 6.4807 | 274.97 | 0.5600 | B |
| 28 | 17.59 | 5.0385 | 169.30 | 0.5600 | B,C,E |
| 29 | 17.77 | 4.9865 | 161.65 | 0.5600 | A,B,F |
| 30 | 18.17 | 4.8797 | 189.15 | 0.5600 | B |
| 31 | 18.30 | 4.8453 | 190.62 | 0.5600 | |
| 32 | 18.46 | 4.8037 | 184.49 | 0.5600 | B,G |
| 33 | 19.80 | 4.4804 | 1000.00 | 0.5600 | A,B,E,F,G |
| 34 | 19.93 | 4.4505 | 971.94 | 0.5600 | A,B,E |
| 35 | 20.26 | 4.3789 | 875.26 | 0.5600 | A,B,C,G |
| 36 | 20.53 | 4.3226 | 670.72 | 0.5600 | A,B,F,G |
| 37 | 20.84 | 4.2585 | 708.64 | 0.5600 | B |
| 38 | 21.05 | 4.2166 | 675.52 | 0.5600 | A,E,G |
| 39 | 21.28 | 4.1714 | 644.71 | 0.5600 | B |
| 40 | 21.51 | 4.1279 | 541.26 | 0.5600 | A,B,D,G |
| 41 | 21.88 | 4.0588 | 478.39 | 0.5600 | B |
| 42 | 22.05 | 4.0277 | 438.65 | 0.5600 | B,G |
| 43 | 22.30 | 3.9839 | 393.72 | 0.5600 | A,B,C |
| 44 | 22.57 | 3.9358 | 493.30 | 0.5600 | B,E,G |
| 45 | 22.78 | 3.8998 | 365.43 | 0.5600 | B |
| 46 | 22.97 | 3.8682 | 356.15 | 0.5600 | A,B,F,G |
| 47 | 23.22 | 3.8277 | 403.56 | 0.5600 | B,C |
| 48 | 23.57 | 3.7709 | 474.25 | 0.5600 | B,G |
| 49 | 23.81 | 3.7341 | 360.86 | 0.5600 | A,F |
| 50 | 24.05 | 3.6974 | 419.27 | 0.5600 | B,E,G |
| 51 | 24.60 | 3.6159 | 586.58 | 0.5600 | B |
| 52 | | | 3.35 | 0.5600 | A,B,C |
| 53 | | | 5.77 | 0.5600 | B,G |
| 54 | | | 2.84 | 0.5600 | A,B,G |
| 55 | | | 2.11 | 0.5600 | B |
| 56 | | | 5.19 | 0.5600 | |
| 57 | | | 9.42 | 0.5600 | B,E,G |
| 58 | | | 3.12 | 0.5600 | A,E,F |
| 59 | | | 4.33 | 0.5600 | G |
| 60 | | | 2.14 | 0.5600 | B |
| 61 | | | 3.78 | 0.5600 | B,D |
| 62 | | | 3.21 | 0.5600 | B |
| 63 | | | 4.04 | 0.5600 | A,B,G |
| 64 | 28.18 | 3.1640 | 225.06 | 0.5600 | B,E |
| 65 | 28.59 | 3.1194 | 200.82 | 0.5600 | A,B,G |
| 66 | 28.73 | 3.1048 | 186.57 | 0.5600 | B |

| | | | | | |
|---|---|---|---|---|---|
| 67 | 28.95 | 3.0818 | 222.84 | 0.5600 | B,C |
| 68 | 29.11 | 3.0651 | 186.01 | 0.5600 | B,C |
| 69 | 29.45 | 3.0310 | 193.75 | 0.5600 | B,G |
| 70 | 29.58 | 3.0176 | 179.40 | 0.5600 | |
| 71 | 29.77 | 2.9988 | 272.14 | 0.5600 | A,B,F |
| 72 | 29.95 | 2.9812 | 210.11 | 0.5600 | B |
| 73 | 30.16 | 2.9607 | 157.21 | 0.5600 | B,G |
| 74 | 30.54 | 2.9249 | 185.58 | 0.5600 | B,E |
| 75 | 30.78 | 2.9027 | 244.37 | 0.5600 | A,B,C,F,G |
| 76 | 32.92 | 2.7183 | 156.97 | 0.5600 | A,B,E,G |
| 77 | 33.26 | 2.6919 | 183.95 | 0.5600 | A,B,C,E,G |
| 78 | 34.97 | 2.5636 | 806.87 | 0.5600 | A,B,C,F,G |
| 79 | 35.17 | 2.5496 | 603.99 | 0.5600 | A,B,F |
| 80 | 35.35 | 2.5368 | 586.72 | 0.5600 | B,E,G |
| 81 | 35.63 | 2.5176 | 595.54 | 0.5600 | A,B,C,E |
| 82 | 36.04 | 2.4901 | 488.55 | 0.5600 | A,B,F |
| 83 | 36.43 | 2.4643 | 343.97 | 0.5600 | A,B,G |
| 84 | 36.62 | 2.4520 | 309.31 | 0.5600 | B,F |
| 85 | 36.84 | 2.4380 | 362.24 | 0.5600 | A,B,E,G |
| 86 | 37.15 | 2.4180 | 432.63 | 0.5600 | A,B,C,G |
| 87 | 37.60 | 2.3902 | 424.85 | 0.5600 | A,B,D |
| 88 | 37.89 | 2.3728 | 408.82 | 0.5600 | B,G |
| 89 | 38.07 | 2.3620 | 396.20 | 0.5600 | A,B,C |
| 90 | 38.25 | 2.3511 | 384.02 | 0.5600 | B,G |
| 91 | 38.61 | 2.3302 | 421.41 | 0.5600 | B,C |
| 92 | 38.79 | 2.3196 | 320.20 | 0.5600 | A,B |
| 93 | 38.99 | 2.3080 | 334.87 | 0.5600 | B,C,E |
| 94 | 39.20 | 2.2963 | 239.90 | 0.5600 | B,F,G |
| 95 | 39.40 | 2.2851 | 198.85 | 0.5600 | B,E |
| 96 | 39.59 | 2.2746 | 175.28 | 0.5600 | B,E,G |
| 97 | 39.73 | 2.2668 | 175.81 | 0.5600 | A,B |
| 98 | 39.92 | 2.2564 | 172.48 | 0.5600 | A,B,E,G |
| 99 | 40.27 | 2.2378 | 222.66 | 0.5600 | A,B,F,G |
| 100 | 40.49 | 2.2258 | 222.75 | 0.5600 | A,B,D |
| 101 | 40.67 | 2.2165 | 204.81 | 0.5600 | E,F,G |
| 102 | 40.88 | 2.2057 | 249.87 | 0.5600 | A,B,C,G |
| 103 | 41.13 | 2.1931 | 201.48 | 0.5600 | A,B,E,F,G |
| 104 | 41.65 | 2.1665 | 416.97 | 0.5600 | B,D,E,G |
| 105 | 41.97 | 2.1508 | 177.58 | 0.5600 | A,B,F,G |
| 106 | 42.24 | 2.1379 | 196.55 | 0.5600 | A,B,F |
| 107 | 42.42 | 2.1293 | 185.20 | 0.5600 | A,B,F,G |
| 108 | 42.71 | 2.1153 | 170.47 | 0.5600 | A,B,C,E,G |
| 109 | 44.23 | 2.0461 | 169.01 | 0.5600 | A,B,C,D,E,F,G |
| 110 | 44.56 | 2.0316 | 177.97 | 0.5600 | A,B |
| 111 | 44.71 | 2.0253 | 197.05 | 0.5600 | B |
| 112 | 45.02 | 2.0121 | 198.72 | 0.5600 | B,E,G |
| 113 | 45.17 | 2.0056 | 213.18 | 0.5600 | A,B,E,G |
| 114 | 45.37 | 1.9974 | 185.22 | 0.5600 | A,B,C,G |
| 115 | 45.81 | 1.9793 | 214.70 | 0.5600 | A,B,E,G |
| 116 | 46.09 | 1.9679 | 187.11 | 0.5600 | A,B |
| 117 | 46.26 | 1.9611 | 163.15 | 0.5600 | B,E,F,G |
| 118 | 46.52 | 1.9506 | 179.49 | 0.5600 | A,B,G |
| 119 | 46.69 | 1.9440 | 175.02 | 0.5600 | A,B |
| 120 | 47.09 | 1.9285 | 174.68 | 0.5600 | A,B,C,D,F,G |
| 121 | 47.35 | 1.9183 | 157.42 | 0.5600 | B,E |
| 122 | 47.55 | 1.9107 | 186.13 | 0.5600 | B |
| 123 | 47.78 | 1.9022 | 157.40 | 0.5600 | A,B,C,E,F,G |
| 124 | 49.29 | 1.8473 | 163.23 | 0.5600 | A,B,C,E,G |
| 125 | 50.71 | 1.7990 | 179.19 | 0.5600 | B,F,G |
| 126 | 50.88 | 1.7932 | 188.69 | 0.5600 | A,B,C,D,E,G |
| 127 | 53.28 | 1.7179 | 165.00 | 0.5600 | A,C,E,F,G |
| 128 | 53.45 | 1.7130 | 163.97 | 0.5600 | A,C,G |
| 129 | 53.74 | 1.7044 | 253.39 | 0.5600 | A,E,G |
| 130 | 53.94 | 1.6986 | 280.24 | 0.5600 | A,F |
| 131 | 54.10 | 1.6938 | 290.29 | 0.5600 | A,F,G |
| 132 | 54.41 | 1.6848 | 305.52 | 0.5600 | A,C,E,F,G |
| 133 | 54.77 | 1.6746 | 294.43 | 0.5600 | A,G |
| 134 | 54.93 | 1.6701 | 303.26 | 0.5600 | C,F,G |
| 135 | 55.16 | 1.6639 | 315.99 | 0.5600 | A,C,E |
| 136 | 55.45 | 1.6558 | 266.46 | 0.5600 | A,E,F,G |
| 137 | 55.70 | 1.6489 | 266.09 | 0.5600 | A,F |
| 138 | 55.87 | 1.6443 | 213.86 | 0.5600 | A,C,G |
| 139 | 56.13 | 1.6374 | 238.76 | 0.5600 | A,E |
| 140 | | | 3.95 | 0.5600 | A,C,D,G |
| 141 | | | 2.44 | 0.5600 | A,D,G |
| 142 | | | 3.85 | 0.5600 | A,E,G |
| 143 | | | 0.75 | 0.5600 | C |
| 144 | | | 9.82 | 0.5600 | A,F,G |
| 145 | | | 3.11 | 0.5600 | A,C,E,F,G |
| 146 | | | 9.69 | 0.5600 | A,C,D,E,F,G |
| 147 | | | 1.09 | 0.5600 | A,C |
| 148 | | | 7.58 | 0.5600 | A,C,E,G |
| 149 | | | 5.95 | 0.5600 | A,C,E,F,G |
| 150 | | | 2.83 | 0.5600 | A,E |
| 151 | | | 6.60 | 0.5600 | A,C,D,F,G |
| 152 | 62.17 | 1.4919 | 501.98 | 0.5600 | G |
| 153 | 62.37 | 1.4877 | 399.06 | 0.5600 | A,F |
| 154 | 62.63 | 1.4821 | 265.26 | 0.5600 | A,E,G |

| | | | | | |
|---|---|---|---|---|---|
| 155 | 62.80 | 1.4785 | 252.14 | 0.5600 | A,E,F,G |
| 156 | 63.14 | 1.4713 | 195.47 | 0.5600 | A,C,E,F,G |
| 157 | 64.08 | 1.4519 | 158.60 | 0.5600 | A,C,E,F,G |

## Rietveld Refinement using FullProf

Calculation was not run or did not converge.

## Integrated Profile Areas

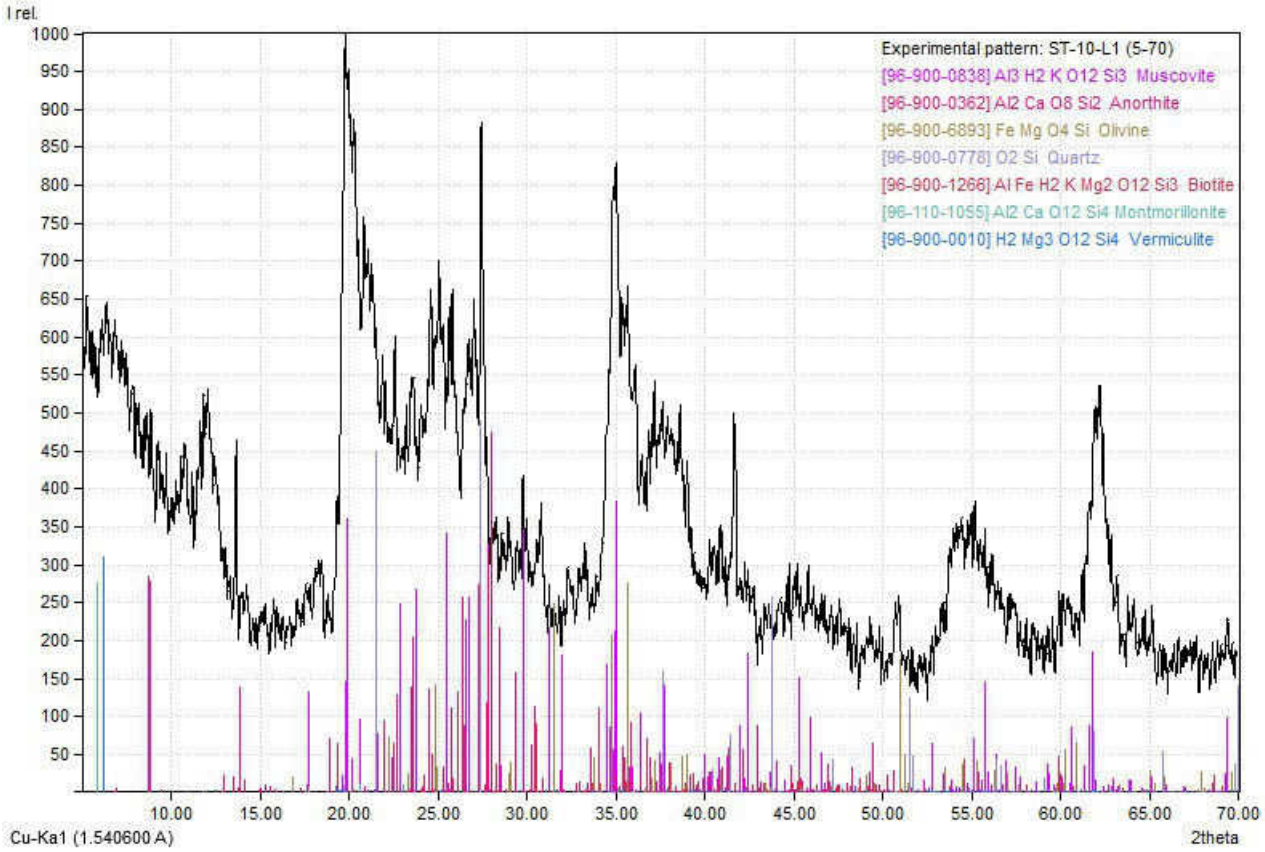
**Based on calculated profile**

| *Profile area* | *Counts* | *Amount* |
|---|---|---|
| Overall diffraction profile | 124378 | 100.00% |
| Background radiation | 79458 | 63.88% |
| Diffraction peaks | 44920 | 36.12% |
| Peak area belonging to selected phases | 37575 | 30.21% |
| Unidentified peak area | 7345 | 5.91% |

## Peak Residuals

| *Peak data* | *Counts* | *Amount* |
|---|---|---|
| Overall peak intensity | 4256 | 100.00% |
| Peak intensity belonging to selected phases | 1658 | 38.96% |
| Unidentified peak intensity | 2598 | 61.04% |

## Diffraction Pattern Graphics



# FINAL REPORT

**Ref : F5501_Rev01** **Job : 232320**

| SAMPLE | Al2O3 | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 |
|---|---|---|---|---|---|---|---|---|---|
| ST1L1 | 26.84 | 0.22 | 0.04 | 13.96 | 0.19 | 0.71 | 0.12 | 0.15 | 0.482 |
| ST1L5 | 30.55 | 0.06 | 0.02 | 13.67 | 0.16 | 0.79 | 0.12 | 0.12 | 0.517 |
| ST2L1 | 25.44 | 1.37 | 0.01 | 10.05 | 0.95 | 1.82 | 0.11 | 0.68 | 0.520 |
| ST2L2 | 30.74 | 0.27 | 0.01 | 11.53 | 0.17 | 0.71 | 0.08 | 0.16 | 0.499 |
| ST3L1 | 27.05 | 0.63 | 0.03 | 13.68 | 0.42 | 1.19 | 0.09 | 0.24 | 0.535 |
| ST3L3 | 31.44 | 0.98 | 0.02 | 14.61 | 0.43 | 1.85 | 0.11 | 0.23 | 0.659 |
| ST4L1 | 28.18 | 0.10 | 0.02 | 13.04 | 0.55 | 1.27 | 0.11 | 0.28 | 0.408 |
| ST4L4 | 29.81 | 0.16 | <0.01 | 11.93 | 0.82 | 1.10 | 0.21 | 0.33 | 0.260 |
| ST5L1 | 17.80 | 1.14 | 0.01 | 9.19 | 0.31 | 1.60 | 0.11 | 0.25 | 0.649 |
| ST5L3 | 27.41 | 1.59 | <0.01 | 12.14 | 0.41 | 3.41 | 0.16 | 0.42 | 0.747 |
| UNI | % | % | % | % | % | % | % | % | % |
| DET | .01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.002 |
| SCH | XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 |

# FINAL REPORT

**Ref : F5501_Rev01** **Job : 232320**

| SAMPLE | SiO2 | TiO2 | S | Total | LOI | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ST1L1 | 28.75 | 2.02 | 0.011 | 99.5 | 26.00 | | | | |
| ST1L5 | 35.82 | 2.03 | 0.030 | 99.3 | 15.42 | | | | |
| ST2L1 | 34.12 | 1.40 | 0.010 | 99.2 | 22.68 | | | | |
| ST2L2 | 38.68 | 1.70 | 0.084 | 99.5 | 14.87 | | | | |
| ST3L1 | 22.21 | 1.85 | 0.039 | 99.4 | 31.41 | | | | |
| ST3L3 | 24.43 | 2.02 | 0.029 | 99.2 | 22.42 | | | | |
| ST4L1 | 37.70 | 1.83 | 0.023 | 99.3 | 15.76 | | | | |
| ST4L4 | 41.42 | 1.65 | 0.018 | 100.0 | 12.45 | | | | |
| ST5L1 | 21.59 | 1.10 | 0.016 | 99.6 | 45.87 | | | | |
| ST5L3 | 27.26 | 1.48 | 0.028 | 99.4 | 24.37 | | | | |
| **UNI** | % | % | % | % | % | | | | |
| DET | .01 | 0.01 | 0.002 | 0 | 0.01 | | | | |
| **SCH** | **XRF250** | **FB1/XRF250** | **FB1/XRF250** | **FB1/XRF250** | **LOI** | | | | |

# FINAL REPORT

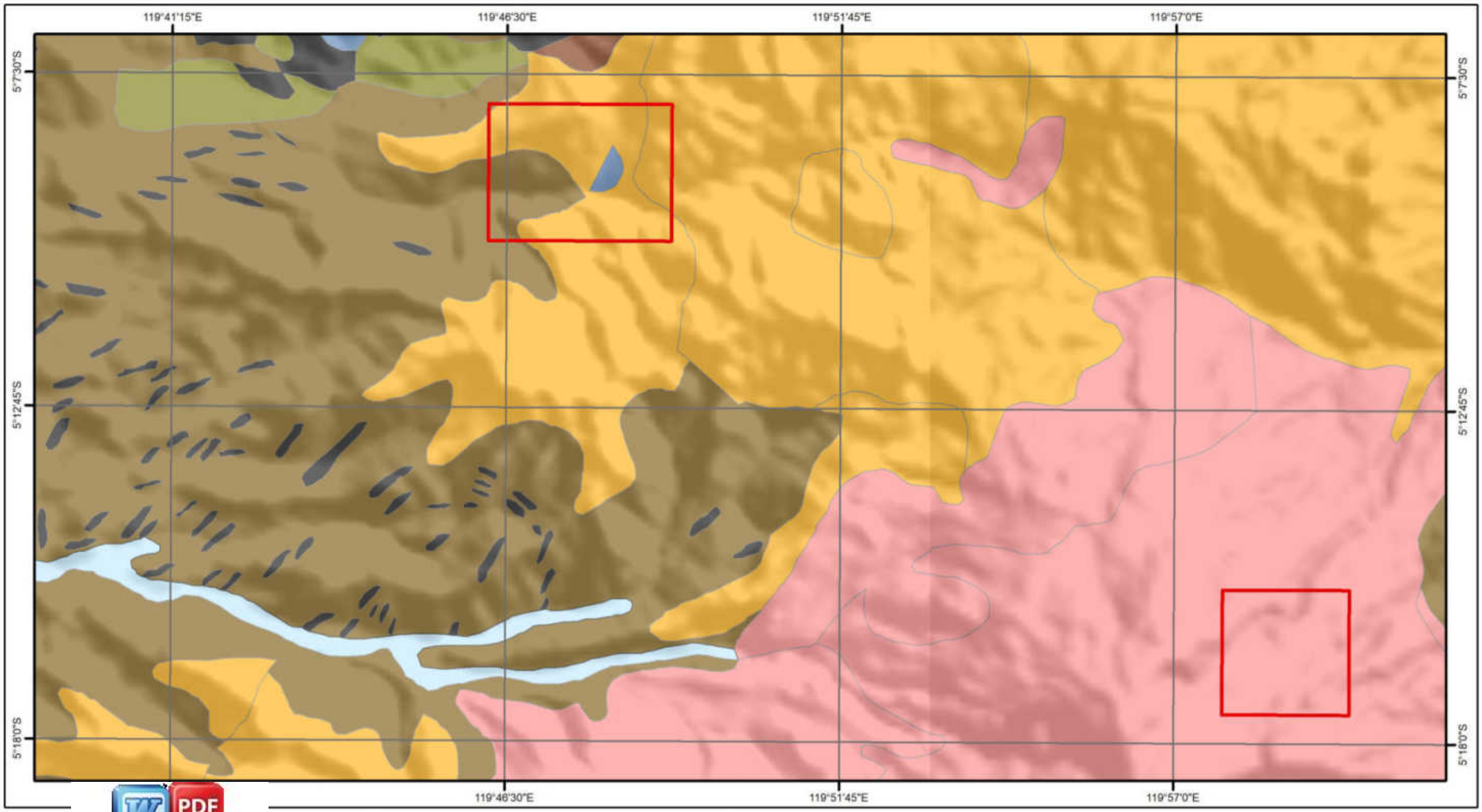
**Ref : F5588** **Job : 232624**

| SAMPLE | Al2O3 | CaO | Cr2O3 | Fe2O3 | K2O | MgO | MnO | Na2O | P2O5 |
|---|---|---|---|---|---|---|---|---|---|
| ST6L1 | 24.34 | 0.16 | 0.01 | 11.15 | 3.79 | 1.30 | 0.31 | 0.15 | 0.201 |
| ST6L3 | 26.47 | 0.03 | <0.01 | 9.08 | 3.59 | 1.31 | 0.24 | 0.16 | 0.116 |
| ST7L1 | 21.78 | 1.90 | 0.01 | 13.11 | 4.49 | 1.93 | 0.36 | 0.26 | 0.279 |
| ST7L3 | 22.99 | 1.77 | 0.02 | 13.45 | 4.74 | 2.22 | 0.37 | 0.25 | 0.279 |
| ST8L1 | 28.15 | 0.30 | <0.01 | 9.56 | 3.49 | 0.87 | 0.33 | 0.27 | 0.213 |
| ST8L3 | 26.24 | 0.05 | <0.01 | 13.27 | 1.60 | 1.32 | 0.88 | 0.09 | 0.218 |
| ST9L1 | 23.68 | 1.32 | <0.01 | 9.08 | 4.65 | 1.62 | 0.38 | 0.30 | 0.263 |
| ST9L2 | 24.58 | 1.24 | 0.02 | 9.27 | 4.47 | 1.70 | 0.38 | 0.31 | 0.286 |
| ST10L1 | 25.96 | 0.31 | <0.01 | 11.66 | 2.64 | 1.13 | 0.40 | 0.22 | 0.234 |
| ST10L3 | 29.92 | 0.18 | 0.02 | 13.02 | 1.63 | 1.11 | 0.43 | 0.07 | 0.209 |
| UNI | % | % | % | % | % | % | % | % | % |
| DET | .01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.002 |
| SCH | XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 |

# FINAL REPORT

**Ref : F5588** **Job : 232624**

| SAMPLE | SiO2 | TiO2 | S | Total | LOI | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ST6L1 | 42.82 | 1.07 | 0.005 | 99.6 | 14.24 | | | | |
| ST6L3 | 48.29 | 1.03 | <0.002 | 100.0 | 9.85 | | | | |
| ST7L1 | 43.28 | 1.16 | 0.008 | 100.0 | 11.50 | | | | |
| ST7L3 | 44.63 | 1.22 | <0.002 | 100.0 | 8.24 | | | | |
| ST8L1 | 45.32 | 1.03 | <0.002 | 100.0 | 10.59 | | | | |
| ST8L3 | 44.73 | 1.24 | <0.002 | 100.0 | 10.56 | | | | |
| ST9L1 | 46.02 | 1.00 | 0.004 | 99.4 | 11.11 | | | | |
| ST9L2 | 46.55 | 1.04 | <0.002 | 100.0 | 10.06 | | | | |
| ST10L1 | 41.80 | 1.12 | <0.002 | 100.0 | 14.51 | | | | |
| ST10L3 | 38.81 | 1.13 | <0.002 | 100.0 | 13.69 | | | | |
| UNI | % | % | % | % | % | | | | |
| DET | .01 | 0.01 | 0.002 | 0 | 0.01 | | | | |
| SCH | XRF250 | FB1/XRF250 | FB1/XRF250 | FB1/XRF250 | LOI | | | | |






GIONAL
AN

SIR

GOWA
2024

N
W E
S

0 1.500 3.000 6.000 9.000 Meter

Skala 1:150.000

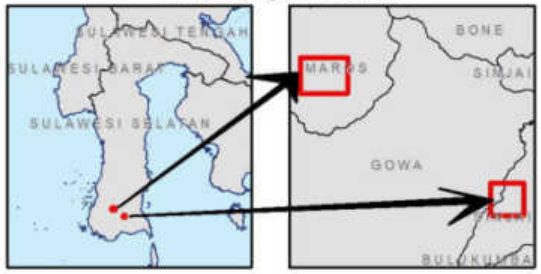
Proyeksi : Universal Traver Mercator
Datum : Datum Geodetik Nasional (DGN) 1995
Koordinat : Geografis

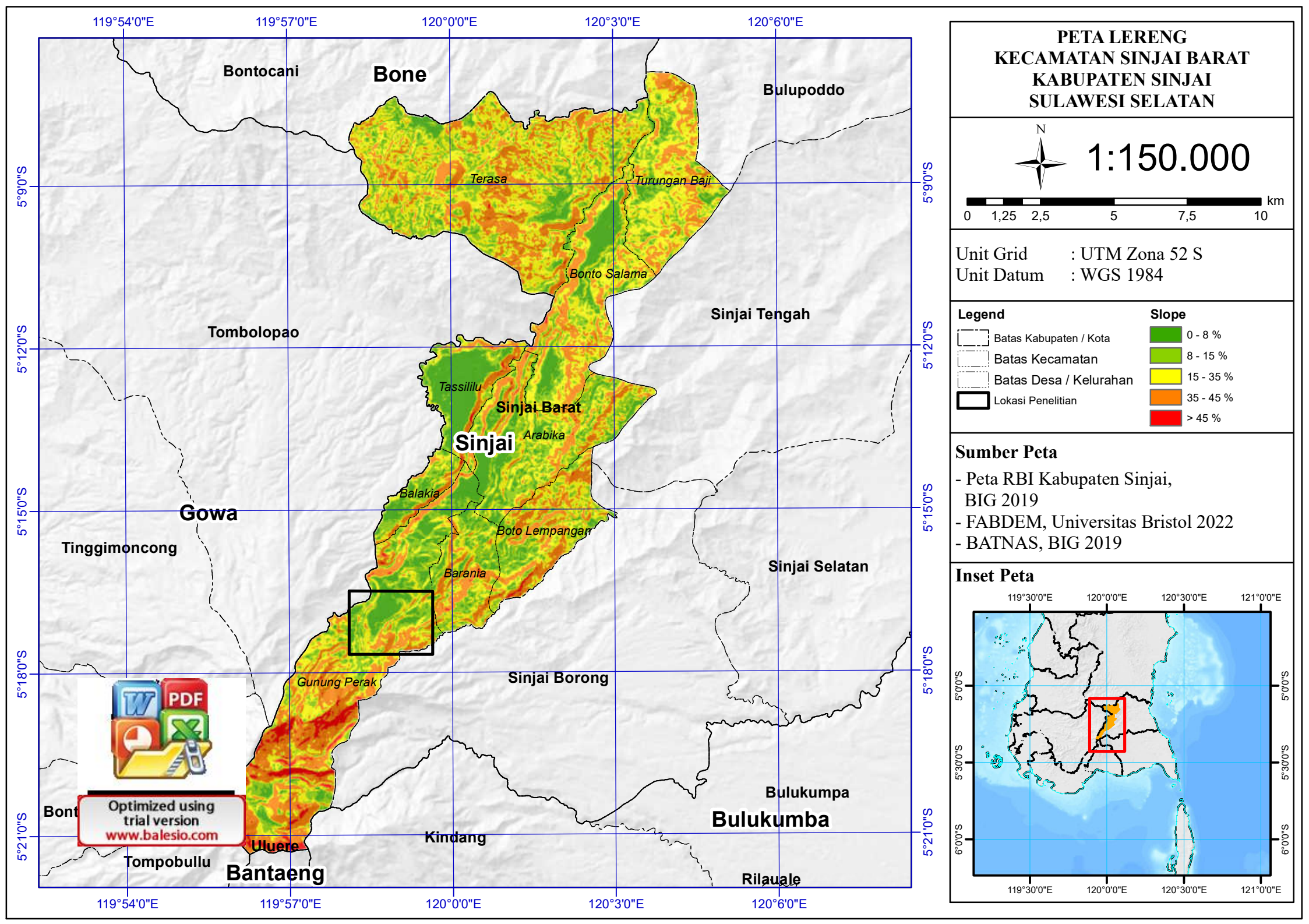
**Legenda :**

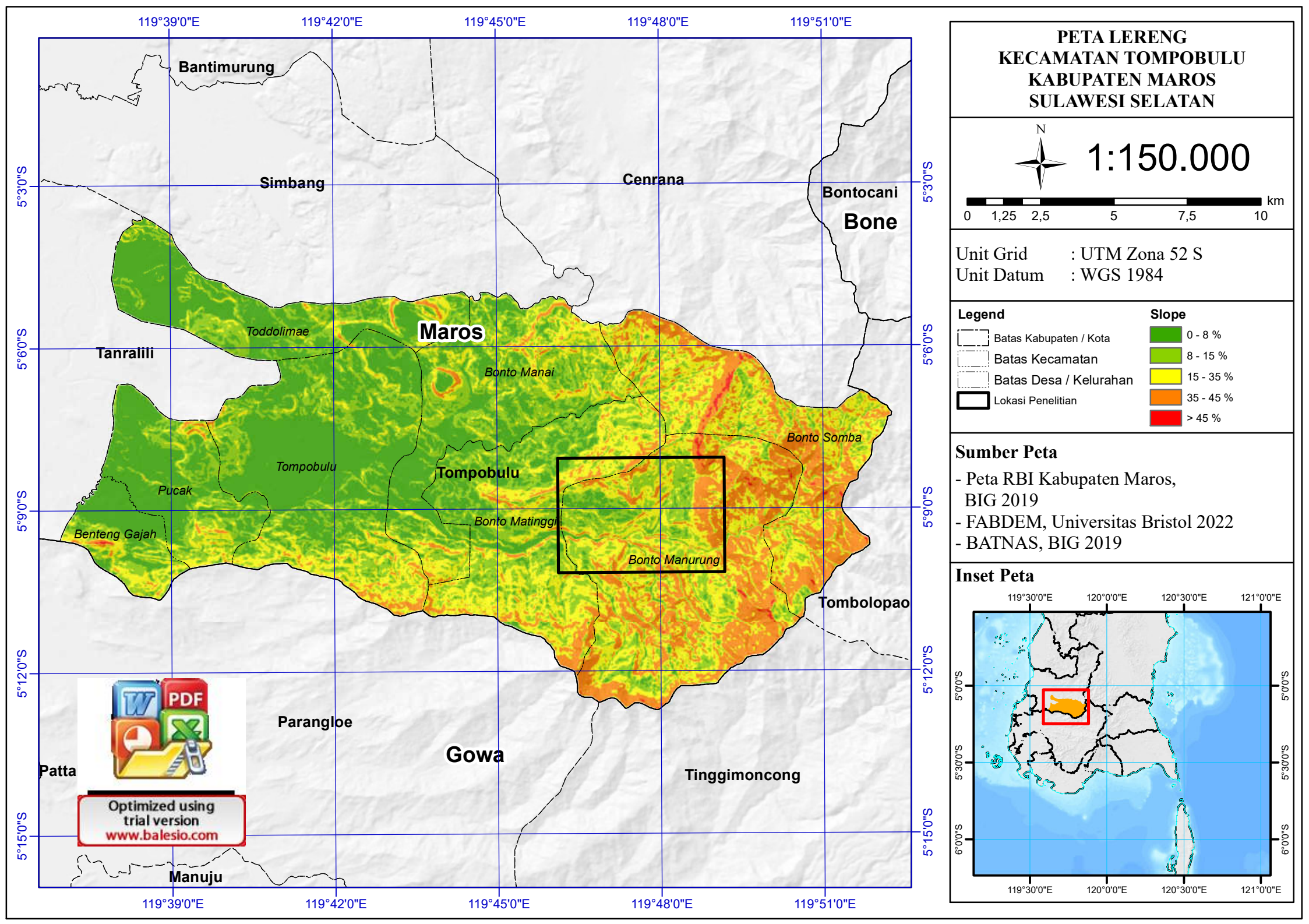
- Formasi Camba
- Formasi Tonasa
- Batuan Gunungapi Lompobatang
- Batuan Gunungapi Baturape-Cindako
- Diorit
- Endapan Aluvium
- Basal dan Retas Basal
- Batas Wilayah Penelitian

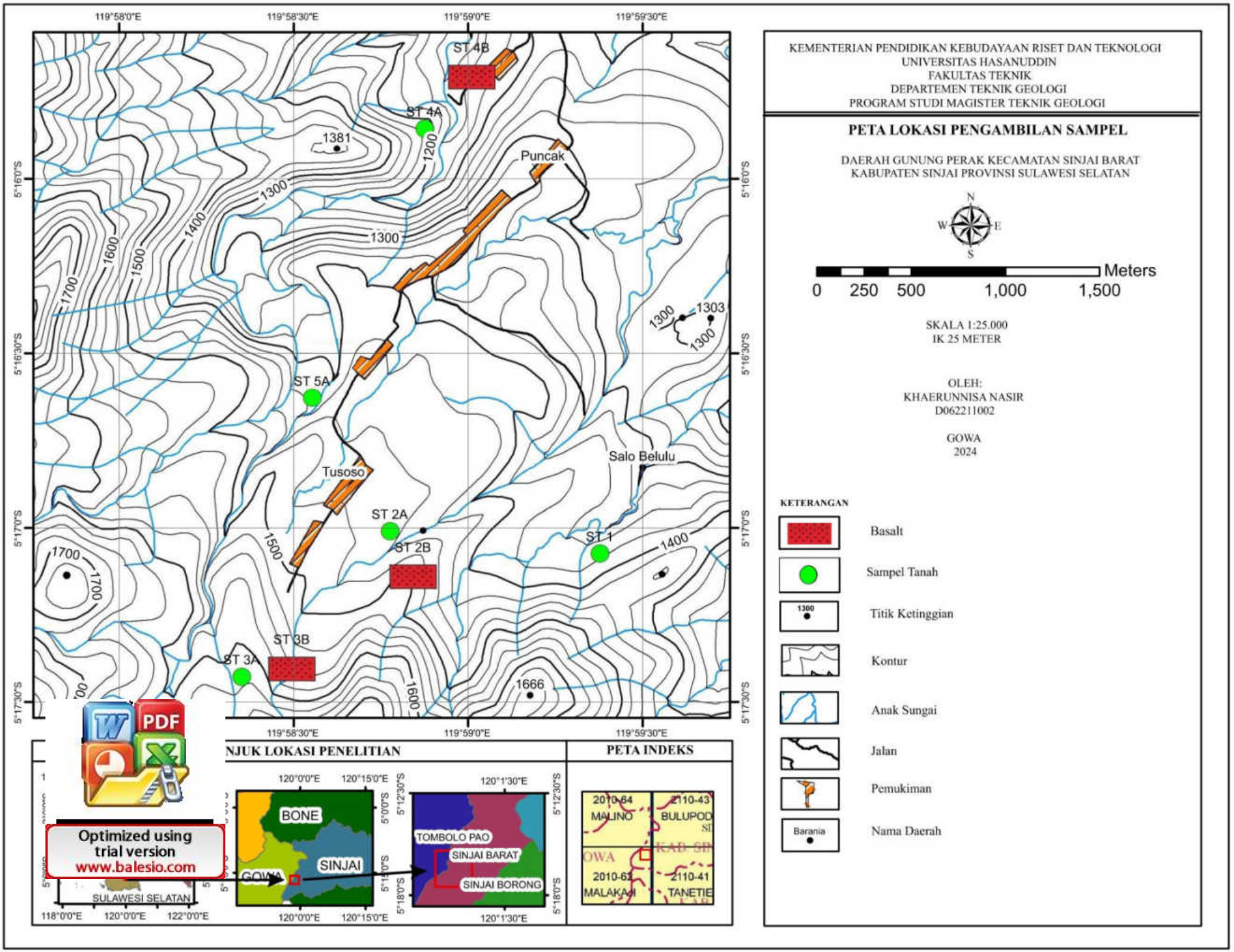
Sumber :
Peta Geologi Lembar Ujungpandang, Benteng dan Sinjai, Sulawesi. Rab Sukamto dan Sam Supriatna (1982)

**Peta Tunjuk Lokasi**




PETA LERENG
KECAMATAN SINJAI BARAT
KABUPATEN SINJAI
SULAWESI SELATAN
N
1:150.000
0 1,25 2,5 5 7,5 10 km
Unit Grid : UTM Zona 52 S
Unit Datum : WGS 1984
Legend
Batas Kabupaten / Kota
Batas Kecamatan
Batas Desa / Kelurahan
Lokasi Penelitian
Slope
0 - 8 %
8 - 15 %
15 - 35 %
35 - 45 %
> 45 %
Sumber Peta
- Peta RBI Kabupaten Sinjai, BIG 2019
- FABDEM, Universitas Bristol 2022
- BATNAS, BIG 2019
Inset Peta
Bontocani
Bone
Bulupoddo
Terasa
Turungan Baji
Bonto Salama
Sinjai Tengah
Tombolopao
Tassililu
Sinjai Barat
Sinjai
Arabika
Balakia
Gowa
Boto Lempangan
Tinggimoncong
Barania
Sinjai Selatan
Gunung Perak
Sinjai Borong
Bulukumpa
Bulukumba
Kindang
Ulu
Tompobullu
Bantaeng
Rilauale
Optimized using
trial version
www.balesio.com
119°54'0"E
119°57'0"E
120°0'0"E
120°3'0"E
120°6'0"E
5°9'0"S
5°12'0"S
5°15'0"S
5°18'0"S
5°21'0"S
119°30'0"E
120°30'0"E
121°0'0"E
5°0'0"S
5°30'0"S
6°0'0"S


PETA LERENG
KECAMATAN TOMPOBULU
KABUPATEN MAROS
SULAWESI SELATAN
N
1:150.000
0 1,25 2,5 5 7,5 10 km
Unit Grid : UTM Zona 52 S
Unit Datum : WGS 1984
Legend
Batas Kabupaten / Kota
Batas Kecamatan
Batas Desa / Kelurahan
Lokasi Penelitian
Slope
0 - 8 %
8 - 15 %
15 - 35 %
35 - 45 %
> 45 %
Sumber Peta
- Peta RBI Kabupaten Maros, BIG 2019
- FABDEM, Universitas Bristol 2022
- BATNAS, BIG 2019
Inset Peta
Bantimurung
Simbang
Cenrana
Bontocani
Bone
Maros
Toddolimae
Tanralili
Bonto Manai
Bonto Somba
Tompobulu
Tompobulu
Pucak
Bonto Matinggi
Benteng Gajah
Bonto Manurung
Tombolopao
Parangloe
Gowa
Patta
Tinggimoncong
Manuju
Optimized using trial version www.balesio.com
119°39'0"E
119°42'0"E
119°45'0"E
119°48'0"E
119°51'0"E
5°3'0"S
5°6'0"S
5°9'0"S
5°12'0"S
5°15'0"S
119°30'0"E
120°0'0"E
120°30'0"E
121°0'0"E
5°0'0"S
5°30'0"S
6°0'0"S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DEPARTEMEN TEKNIK GEOLOGI
PROGRAM STUDI MAGISTER TEKNIK GEOLOGI
PETA LOKASI PENGAMBILAN SAMPEL
DAERAH GUNUNG PERAK KECAMATAN SINJAI BARAT
KABUPATEN SINJAI PROVINSI SULAWESI SELATAN
SKALA 1:25.000
IK 25 METER
OLEH:
KHAERUNNISA NASIR
D062211002
GOWA
2024
KETERANGAN
Basalt
Sampel Tanah
Titik Ketinggian
Kontur
Anak Sungai
Jalan
Pemukiman
Nama Daerah
Meters
0 250 500 1,000 1,500
ST 4B
ST 4A
ST 5A
ST 2A
ST 2B
ST 3A
ST 3B
ST 1
Puncak
Tusoso
Salo Belulu
1381
1303
1666
PETA INDEKS
PETUNJUK LOKASI PENELITIAN
BONE
SINJAI
GOWA
TOMBOLO PAO
SINJAI BARAT
SINJAI BORONG
SULAWESI SELATAN
Optimized using
trial version
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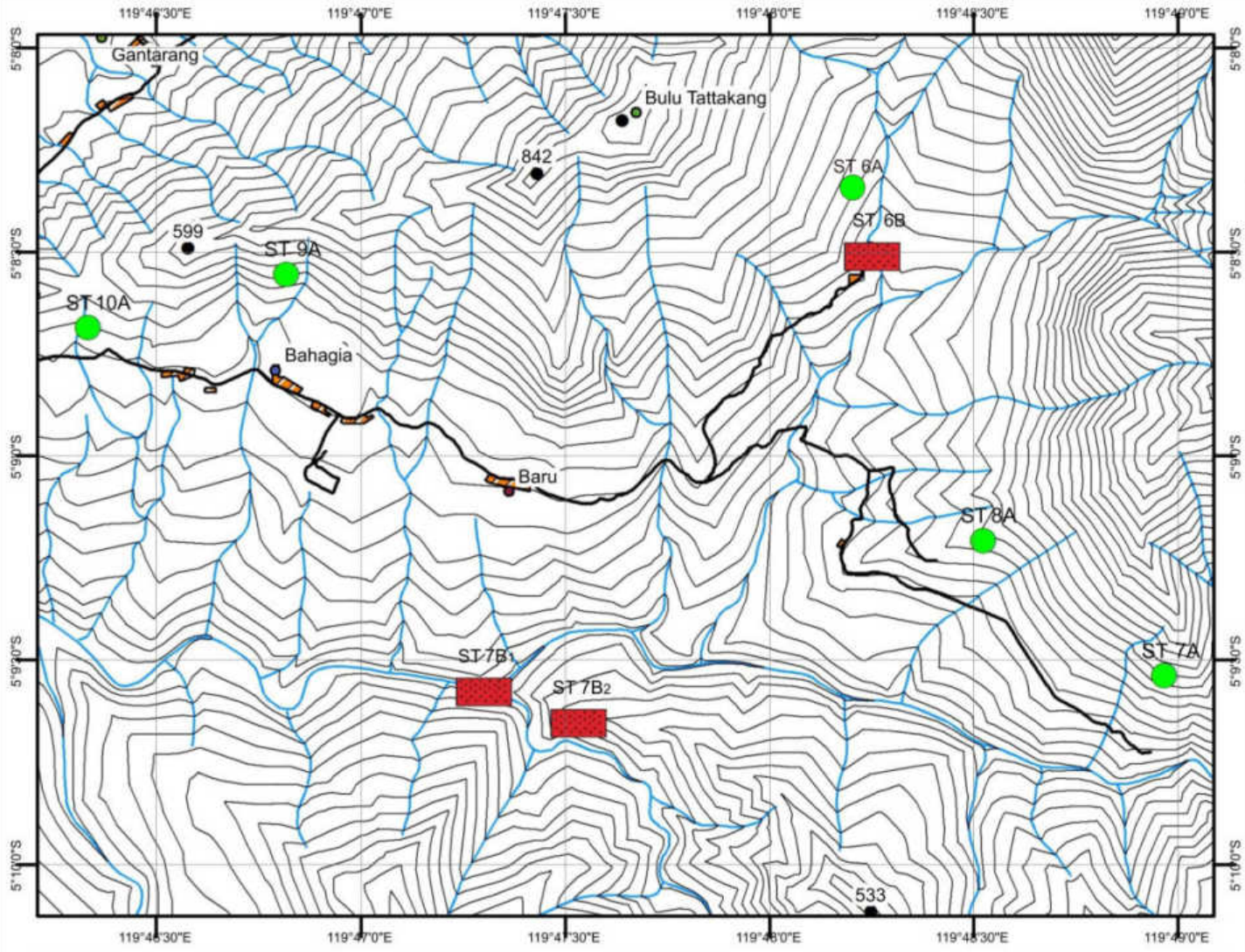


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# PETA LOKASI PENGAMBILAN SAMPEL

DAERAH BONTOSOMBA KECAMATAN TOMPOBULU
KABUPATEN MAROS PROVINSI SULAWESI SELATAN

N
W E
S

0 300 600 1,200 1,800 Meters

SKALA 1:25.000
IK 25 METER

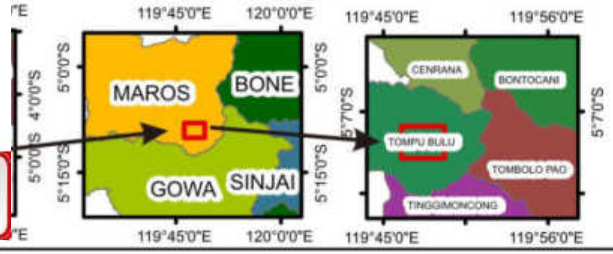
OLEH:
KHAERUNNISA NASIR
D062211002

GOWA
2024

**KETERANGAN**

- Basalt
- Sampel Tanah
- 1225 — Titik Ketinggian
- 600 — Kontur
- Anak Sungai
- Jalan
- Pemukiman
- Bontomanai — Nama Daerah

**TA TUNJUK LOKASI PENELITIAN**




**PETA INDEKS**