Lithium Characterisation – TIMA-X

COMPREHENSIVE MINERALOGICAL ANALYSIS FOR EXPLORATION AND PLANT PRODUCT CHARACTERISATION

- Whole rock characterisation and liberation analysis
- Use of LA-ICP-MS (also standard for mica speciation)
- Standard assay and XRD practices utilised

From Discovery to Recovery

Quantitative mineral distribution and the alteration patterns determine different geological horizons. This information is used to navigate to the mineral ore deposits. The TIMA automated mineralogy technique allows for visualisation and quantification of the textural relationship between the target minerals (spodumene, petalite and Li-mica) and the gangues (quartz, albite and potassium feldspars). The acquired X-ray spectra, which provide chemical compositions of all defined minerals, can be used to illustrate and quantify the distribution of the penalty elements.

In the case of the micaceous minerals, lithium can be found in muscovite (low concentration) and lepidolite-z innwaldite (high concentration). Processing out muscovite could significantly lower the recovery of Li and make it harder for good assay reconciliation. Composite minerals between lepidolite, muscovite and gangues are common. The powerful TIMA software allows segmentation of the spectral data so that a small difference in lithium content can be detected across a mineral grain.

*Spodumene from LCT pegmatite (top-rock chip; bottom-final spodumene concentrate).*
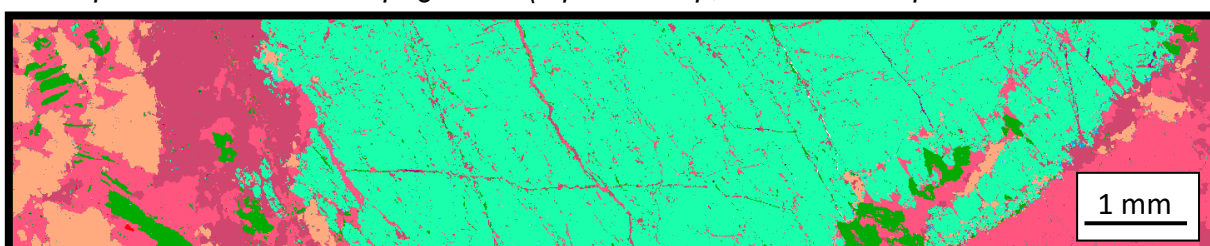
Legend:
- Spodumene
- Quartz
- Albite
- Orthoclase
- Montebrasite
- Muscovite
- Lepidolite
- Petalite
- Apatite

1 mm

500 um

Where is your lithium hosted?

Lithium can be found in various minerals but only a few are of economic value. TIMA mineral liberation studies are used to optimise process flow sheets for grinding, flotation and leaching strategies. Optimisation can be achieved by monitoring the concentration and proportion of the valuable minerals and the gangues in different metallurgical stream samples. The mineralogy of the complex particles and the surface exposure characteristics of the valuable minerals define the opportunities to achieve the best mineral recoveries at the highest possible grades.

Lithium distribution in the final concentrated product

Lithium Deportment
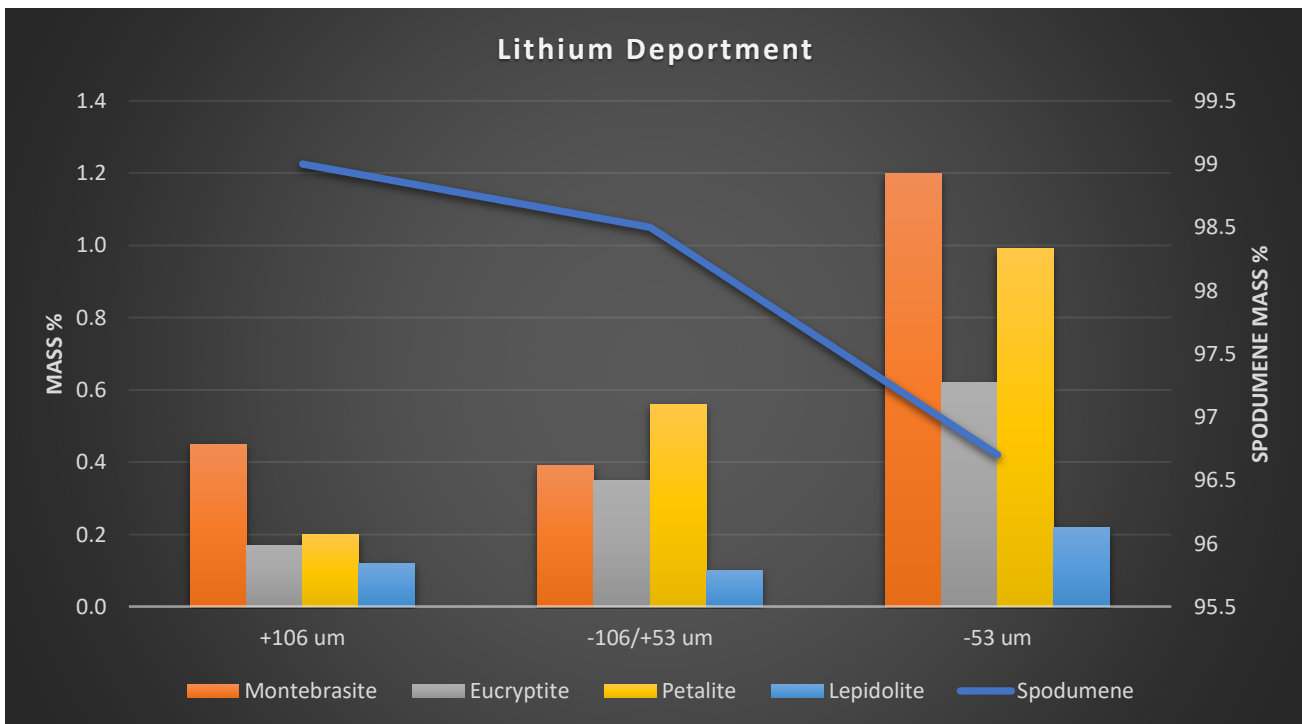
Spodumene grain size distribution and liberation/locking characteristics

Spodumene Grain Size Distribution

Spodumene Liberation/Locking

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