

### **Unravelling Rubidium Enrichment in Highly Fractionated Pegmatites: Insights from the High-Grade Mt Edon Deposit, Western Australia**

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The Mt Edon rubidium (Rb) deposit is located in the southern part of the Paynes Find Greenstone Belt within the Murchison Domain of the Youanmi Terrane (Yilgarn Craton, Western Australia). The area hosts one of the highest-grade rubidium pegmatite deposit reported to date, with an inferred mineral resource of 3.6 Mt grading 0.22% Rb<sub>2</sub>O and 0.07% Li<sub>2</sub>O (at a 0.10% Rb<sub>2</sub>O cut-off), including a high-grade zone of 1.3 Mt grading 0.33% Rb<sub>2</sub>O and 0.07% Li<sub>2</sub>O (0.25% Rb<sub>2</sub>O cut-off). Mt Edon provides a valuable opportunity to investigate Rb enrichment and mineral deportment within highly fractionated Lithium-Cesium-Tantalum (LCT) systems.

The deposit is characterised by a 1.2 km-long pegmatite corridor comprising NE-trending, folded pegmatite sills. The pegmatites, which display mineralogical zoning, are mainly characterised by a medium-grained albite–quartz–muscovite assemblage, with local segregations of microcline–quartz–muscovite and small pods of lepidolite. Spodumene, petalite, zinnwaldite and cookeite occur as accessory phases. Muscovite exhibits the highest Rb concentrations, up to ~7,600 ppm, followed by microcline (~5,000 ppm) and cookeite (~2,000 ppm).

This study aims to further assess the nature and distribution of rubidium and lithium mineralisation at Mt Edon, providing a comprehensive characterisation of Rb and Li mineral deportment to support the optimisation of potential recovery pathways. Mineralogical and chemical characterisation has been undertaken from drill core to micro scale. By combining systematic hyperspectral characterisation with quantitative XRD, micro-XRF mapping, electron probe microanalysis (EPMA), and LA-ICP-MS mineral analysis, this project delivers new insights into the geochemical signatures and mineral deportment of rubidium and its associated pathfinder elements. These findings will contribute to a better understanding of rubidium enrichment in highly fractionated pegmatites and inform exploration strategies for Rb-rich systems.