Goldschmidt 2022 Abstract
https://doi.org/10.46427/gold2022.10290

The formation of stratabound V rich mineralization at the Rod Property, Yukon Territory

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The world is in increasing need of critical elements such as Ni, Mo, V, and PGEs as we transition away from fossil fuels and to renewable energy. Vanadium is of particular interest due to its potential use in longer-lasting batteries. For this to happen new deposits need to be located and exploited. Hyper-enriched black shales (HEBS) in the Northwestern Canada are potential sources of these critical metals. At present most of the work in the northwestern Canada has been on the occurrences in the Richardson Trough and Nic Deposits [1]. Despite all these studies however, a conclusive model on how these HEBS formed still is not available which hampers model-based exploration. Furthermore, it is still unclear how these critical metals are held within the shales which complicates determining the most effective way to extract the metals from the ore [2]. Given these issues, this project focuses on using a suite of geochemical analyses to provide an insight into how deposits like these could have formed. We focused on the Rod Property in particular, as this site is uniquely rich in V, Ni, & Mo - something that no other Yukon HEBS possesses. Whole-rock geochemical analyses have located a mineralized interval of 125 ppm Mo, 594 ppm Ni, and 2,956 ppm V across 24.65m. Here we report bulk sample geochemistry (major elements by XRF, trace elements by ICPMS, TOC, TIC, and TS), detailed optical and scanning electron microscopy and in situ LA-ICPMS analyses to identify correlations between different elements and to identify the individual phases that host the critical metals in the deposit. These data will be used to better understand how the mineralization formed and develop a better predictive model for similar mineralization.

[1]: Gadd & Peter (2018), *Targeted Geoscience Initiative: 2017 report of activities, volume 1,* 193-206.

[2]: Gadd, Peter, Jackson, Yang & Petts (2019), *Ore Geology Reviews* 107, 600-614.