

HETEROGENITE CHARACTERISATION BY RAMAN MICROSCOPY (KATANGA, RDC)

Christian Burlet¹, Yves Vanbrabant¹, Laetitia Dupin¹, Herman Goethals¹, and Tom Thys¹

¹ Royal Belgian Institute for Natural Sciences, Geological Survey of Belgium, Rue Jenner 13, BE-1000 Brussels, Belgium, christian.burlet@naturalsciences.be

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Heterogenite (CoO.OH), which is operated in numerous formal and informal mining sites through the Lufilian Arc in the Katanga Province - Democratic Republic of Congo (DRC) represents a potential important source of tax incomes for the DRC and its Katanga Province. The illegal extraction and trade of this commodity lead however to a squandering of this natural mineral resource. Heterogenite thus represents an interesting candidate for a traceability/certification program and needs to be better characterized.

In this presentation, we bring out the main results of scientific measurements conducted on heterogenite samples from several formal and informal mining sites throughout the Katanga Province. The analytical methodology takes into account the natural variability of ore bodies and the techniques that can be applied to conduct the analytical traceability of the ore. We put forward the relationship between the geochemical composition (microprobe and EDS analysis) of heterogenite samples and their Raman spectroscopic response.

Three main Raman responses have been obtained for this mineral, one of them resulting from the laser-induced deshydroxylation of heterogenite into a Co-spinel structure. This transformation has been investigated and confirmed by EBSD technique. The geochemical study then established a close relationship between the chemical substitutions of Co by other cations (mainly Cu, Ni, Mn and Al) and their impact on the mineral Raman response.

Raman microscopy proved to be an excellent tool to study samples just minutes after collection. This allowed analyzing a large amount of raw samples and polished sections in order to give a clear view of the Raman spectral response variability within a mine.

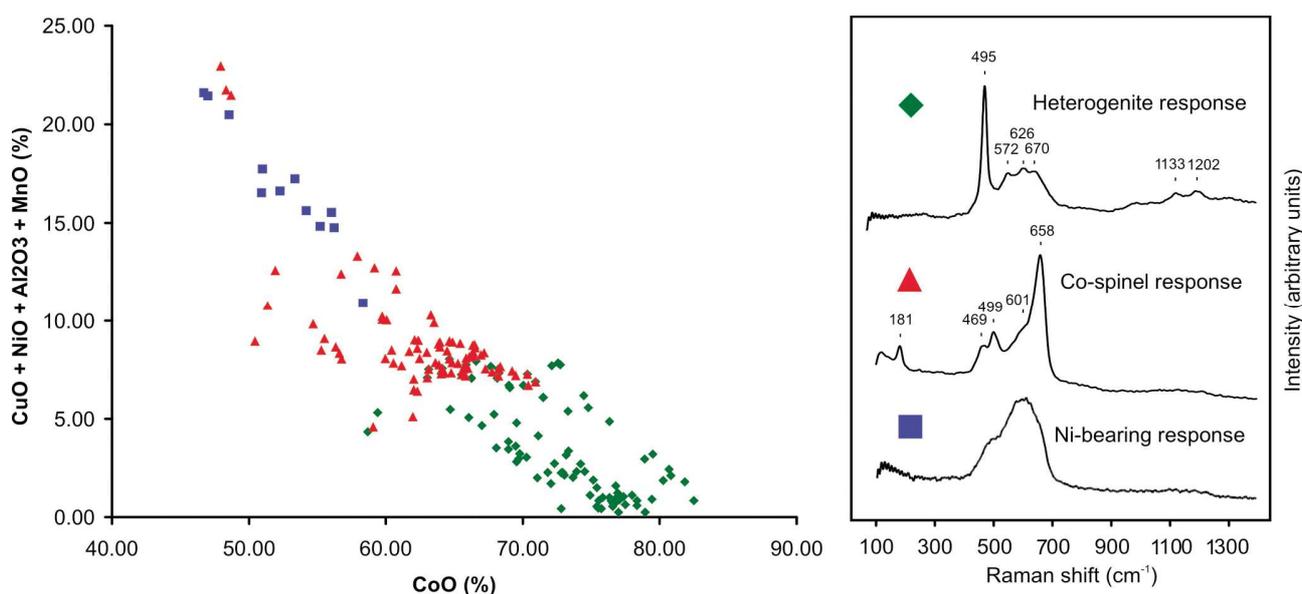


Fig. 1 Synthetic view of the electronic microprobe analysis made on heterogenite samples for 10 mines across the Lufilian Arc. The main secondary cations (Cu, Ni, Mn and Al) are plotted against Co content and classified according to their Raman signatures