

Mineralogy of contrasting tailing deposits in Chile and relation to source deposits: potential for recovery of valuables

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El Buitre, Bellavista and Cauquenes are three tailing deposits located in Chile, in Atacama, Valparaíso and O'Higgins Regions, respectively. Each of these tailings contain waste that derive from different deposit types: El Buitre from IOCG, Bellavista from mesothermal gold veins and Cauquenes from porphyry copper.

According to chemical analyzes made by the Chilean Geological Service, they present interesting levels of critical elements that could be exploited (eg. Co, REE, Ga). However, there is no clear information about the minerals that host these elements and whether they are metallurgically extractable and economically profitable. For this reason, this study seeks, in the first place, to determine in which mineral phase the valuable elements are found, and secondly, to establish a comparison between the mineral phases and the deposits from which the tailings originate.

To achieve this, samples obtained from these deposits have been characterized chemically and mineralogically by ICP-MS and XRD analysis, respectively.

Preliminary results show: for Cauquenes tailings association between REE and apatite and clay minerals, and between Co and pyrite; for Bellavista tailings, high concentrations of Ga potentially associated with mica minerals such as biotite. El Buitre shows good relations between REE and apatite as well as with clay minerals, and between Co and pyrite.

The implications include: generating an investigation methodology depending on the type of the deposit that the tailings come from, using public data and complementing the information that is available about the origin of critical elements and minerals that host them, to study profitable recovery techniques.