

## **REE-mineralogical characterization of mine wastes and revalorization of the Palabora Igneous Complex**

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Several mining companies are currently operating in the Palabora Igneous Complex (PIC) to extract mainly copper, phosphate and vermiculite. Byproducts such as magnetite, zirconium, nickel sulphate and anode slimes with gold, silver and platinum are also obtained. Spite of the high REE grade of foskorites and carbonatites, these resources has never been benefited. Long time mining activity on this area has generated multiple tailings and waste rock dumps (WRD), regardless its economical potential as REE source (more details in Gómez-Arias et al., in this issue)

. The aim of the present study was to assess the waste revalorization of PIC, by means of detailed mineralogical and textural characterization of REE-bearing minerals in both WRD and tailings.

Qualitative mineralogical and textural determinations have been carried out by XRD, optical microscope, SEM-EDAX and EPMA. Quantitative mineralogy has been estimated by compositional SEM-image analyses. The REE mineralogical suit in WRD includes micrometric-grains of monazite, bastnasite, parisite, allanite and anzaite. Other REE-bearing minerals are coarse fluorapatite (mean REE concentration of 1.4%) and calcite (mean REE concentration of 1.5%). REE mineralogy in tailing samples consist of fine grained monazite and minor REE rich-zircon (up to 13.2%), thorianite (up to 10.2%) and fluorapatite (up to 10%).

The identification of high amounts of REE-bearing minerals in PIC wastes contributes to revalorize and reclassify these wastes as by-product. The mineralogical characterization will lead to design specific REE extractive techniques for PIC wastes, promoting the transformation of environmental liabilities into mining assets.