## Evaluation of the Red Mud Potential of the Rusal Plant Friguia in the Republic of Guinea for the Extraction of Rare Earths

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## ABSTRACT

The production of critical metals from secondary resources is essential to support the development of technologies that depend on them, in particular those related to the ecological transition. In this context, the present research aims to assess the potential of red mud produced at the Rusal plant Friguia in the Republic of Guinea for the recovery of critical metals. On the one hand, this toxic red mud is increasing in the world without significant recovery while on the other hand, the pressure on primary mineral resources is increasing. As an example, for the Rusal plant in Friguia, more than 5 million  $m^3$  of red mud has been generated since 1960. It is generally very alkaline (pH around 12) and contains fluoride and heavy metals, among other potential pollutants. In this context, the effective long-term storage of red mud poses serious environmental and health problems. One possible way to valorize these residues is the extraction of precious metals, including critical metals. This is the case of rare earth elements whose interest lies in their magnetic, optical or electrical properties. With this in mind, we aim to develop alternative selective extraction processes to traditional pyro and hydro-metallurgy approaches. Preliminary characterization studies are currently being carried out for the Rusal bauxite tailings and compared with characterization data obtained on bauxite tailings of different origin (formed lateritic vs karst bauxites). Additionally, preliminary leaching tests are underway under mild pH conditions using ligand-promoted dissolution approaches. The first characterization and leaching results will be presented during the conference.

Keywords: Bauxites, Red mud, Rusal Friguia

