

THE EXTRACTION AND REFINING OF SCANDIUM FROM NIOCORP'S ELK CREEK DEPOSIT

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Abstract

NioCorp is developing the niobium/scandium/titanium Elk Creek carbonatite deposit. The probable reserves announced by the company in 2019 indicated significant niobium (0.81% Nb₂O₅), titanium (2.86% TiO₂), and scandium (65.7 g/t), and is composed predominantly of calcite, dolomite, and ankerite, with lesser levels of chlorite, barite, phlogopite, pyrochlore, serpentine, fluorite, sulphides and quartz. Niobium is mostly (80%) contained in pyrochlore with the balance in various Fe-Nb-Ti oxides, which also host most of the titanium. Scandium is primarily deported in dolomite, with lesser quantities in pyrochlore and biotite.

The process flowsheet recovers separate niobium, titanium, and scandium products. Scandium is extracted from whole ore hydrochloric acid leach solutions using D2EHPA solvent extraction and is further refined through a re-leach and precipitation process to produce high purity scandium oxide. Scandium leach residues are treated in a sulphuric acid sulphation process to recover separate niobium and titanium precipitates as well as to solubilize the remaining scandium. Both hydrochloric acid and sulphuric acid reagents are recycled within the flowsheet. NioCorp is investigating the production of an Aluminum-scandium master alloy from scandium oxide.

This paper will discuss key bench and pilot test results of the scandium extraction and recovery. A conceptual flowsheet as developed by the project team for NioCorp at SGS Minerals will be presented.