

Nickel-Cobalt-Copper Keynote

FLWSHEET OPTIONS FOR COBALT RECOVERY IN AFRICAN COPPER-COBALT HYDROMETALLURGY CIRCUITS

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ABSTRACT

The price of cobalt has increased by some 250% in the past two years, mainly due to increasing demand for lithium-ion batteries, which are in widespread use in consumer electronics. Recent legislation regarding electric vehicles will further increase demand. There are limited options for alternatives to cobalt in these batteries at present. With an official production of 66,000 t in 2016, the Democratic Republic of Congo produces more than half of the world's cobalt, eight times more than its closest competitor.

Many African Copperbelt operations have traditionally focused mainly on copper production; however, it has now become imperative to also consider cobalt recovery from these ores. A plethora of processing routes can be considered. Most hydrometallurgical flowsheets recover cobalt from the raffinate of the copper solvent-extraction circuit, although dedicated cobalt leaching, which typically requires reductive conditions, is now considered. Downstream purification processes include sequential precipitation with a variety of reagents, solvent extraction, and ion exchange. Product choices include hydroxide, sulphate, carbonate, and metal cathode.

This paper assesses technical and economic advantages and limitations of various approaches to the hydrometallurgical processing of cobalt in an African context.

Keywords: Cobalt, hydrometallurgy, flowsheet development, Africa