

GOLD LEACHING AND RECOVERY FROM THIOSULPHATE SOLUTION BY MINERAL PRECIPITANT

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ABSTRACT

A process has been developed to extract gold from a copper sulfide by-product via in-situ generated thiosulphate and subsequent precipitation of the leached gold into a high-grade saleable copper sulphide concentrate.

Controlled oxidation of a gold-bearing pyritic concentrate, at an alkaline pH, generates in-situ thiosulfate. The scavenger pyrite concentrates used in this study were obtained as part of the flotation circuit under development for a copper-gold ore. The in-situ thiosulfate, combined with solubilized copper from oxidation of the copper minerals in the sulfide product, enables direct extraction of gold. The recovery of gold from solution can be obtained by many methods. In this study, the gold-containing thiosulfate solution was separated after leaching and treated with a portion of high-grade copper concentrate as a chemical precipitant for gold and copper. It was found that solubilized gold and copper precipitated on the copper minerals in the concentrate (eg. chalcopyrite) resulting in almost complete recovery of gold and substantial recovery of copper. The gold-free solution is recycled to leaching to continue the extraction process.

The advantage of this process is the use of “in situ” generation of thiosulfate and utilization of available copper concentrate for gold recovery from solution. Gold leaching by this method meets or exceeds the extraction values obtained by cyanidation. The copper concentrate, enriched in gold and copper, captures the value of the increased gold recovery in the copper concentrate smelter payments.

Keywords: Copper flotation products, non-cyanide gold process, thiosulphate leaching