

Novel biooxidation process for low grade refractory sulfidic ores

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ABSTRACT

This study introduces a novel sulphide biooxidation process, Sand Farming which utilizes a coarser ground ore sample. Conventional processes such as roasting, pressure oxidation and tank biooxidation can be applied to sulphide oxidation, but high capital and operation costs limit their applications to low-grade sulphide gold ore. Therefore, Sand Farming was investigated including feasibility studies and economic evaluation. Two sulphide gold ores (sample A and B) containing 3.42 g/t Au with 1.28% sulphur and 3.18 g/t Au with 1.16% of sulphur were used for this study. Each sample was tested for both 14 days of tank biooxidation with finely ground ore sample (P80 75µm) and 43 days of Sand Farming with coarser ground sample (P80 0.6mm). After each biooxidation step, residues were collected for cyanidation for final gold extraction. The cyanidation tests with P80 75µm samples before any microbial pre-treatment showed the gold extractions of 64% and 62% for sample A and B, respectively. After 14 days of tank biooxidation, the gold extraction increased to 81% and 83% for A and B. The gold extraction after 43 days of Sand Farming showed 72% and 68%. Tank biooxidation showed more gold extraction improvement mainly because of the much smaller particle sizes. Sand Farming with coarser materials showed a promising results that can applied to treat the low grade sulphidic refractory ores.

Keywords: Sand Farming, Biooxidation, Tank biooxidation, Refractory sulphide, Sulphide oxidation, low grade gold ore