REDOX CONDITIONS IN THE SELECTIVE FLOTATION OF ENARGITE

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ABSTRACT

Enargite (Cu_3AsS_4) is a Cu-As mineralogical species which occcurs in some Chilean porphyric copper ores deposits. This mineral exhibits a good floatability with different sulphidrylic collectors, such as, xanthates, dithiophosphates, thionocarbamates and xanthogen formates, incorporating As impurities to the copper concentrates. Consequently, enargite is responsible for the serious environmental problem produced by toxic arsenic emissions from copper smelters.

The development of a process to separate enargite from the other species present in the copper concentrates, i.e., chalcocite, chalcopyrite and pyrite, is highly necessary. In this work the flotation of these minerals was comparativelly investigated under oxidizing conditions regulated by hydrogen peroxide. The flotation of enargite, chalcocite, chalcopyrite and pyrite in Hallimond tube, with H_2O_2 additions in Eh range +285mV to +410mV(SHE), and floated at pH 8 with isopropyl xanthate, was investigated. It was demonstrated that enargite is highly resistent to depression even under strong oxidizing conditions. However, at pulp potentials values around +325mV chalcocite and pyrite were completelly depressed. Chalcopyrite was also partially depressed at higher potentials. Consequently, the selective flotation of enargite from Cu and Fe sulfides is technically feasible by regulation of redox conditions of the pulp. Results are interpreted on the basis of Eh-pH diagrams.