

Removal of Copper from Wastewaters by Nano-Micro Bubble Ion Flotation

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Abstract : The removal of copper from a dilute synthetic wastewater (10 mg/L) was studied by ion flotation at laboratory scale. Anionic sodium dodecyl sulfate (SDS) was used as a collector and ethanol as a frother. Different parameters such as pH, collector and frother concentrations, foam height and bubble size distribution (multi bubble ion flotation) were tested to determine the optimum flotation conditions in a Denver type flotation machine. To see into the effect of bubbles size distribution in this paper, a nano-micro bubble generator was designed. The nano and microbubbles that are generated in this way were combined with normal size bubbles generated mechanically. Under the optimum conditions (concentration of SDS: 192mg/l, ethanol: 0.5%v/v, pH value: 4 and froth height=12.5 cm) the best removal obtained for the system Cu/SDS with a dry foam (water recovery: 15.5%) was 85.6%. Coalescence of nano-microbubbles with bubbles of normal size belonging to mechanical flotation cell improved the removal of Cu to a maximum floatability of 92.8% and reduced the water recovery to a 13.1%. The flotation time decreased considerably at 37.5% when the multi bubble ion flotation was used.

Keywords : froth flotation, copper, water treatment, optimization, recycling

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