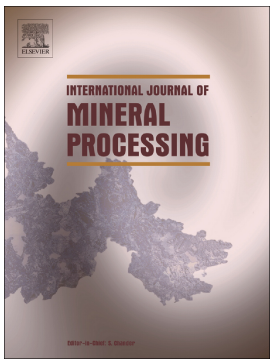

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Effect of typical impurities for the formation of floating slimes in copper electrorefining

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Abstract

In electrorefining, Group 15 impurities arsenic, antimony and bismuth, may precipitate within the bulk electrolyte as floating slimes and contaminate the copper cathodes. In order to determine the impurity specific thresholds related to the formation of suspended solids, synthetic copper electrorefining electrolytes with different concentrations of arsenic, antimony and bismuth were investigated by a continuous filtration method. The amount and composition of the floating slimes obtained were evaluated in terms of the initial impurity concentrations present in the synthetic electrolyte. As a result, the specific influence of arsenic, antimony and bismuth on the floating slime formation was ascertained. The results suggest that there is an upper limit in electrorefining electrolytes for antimony (Sb) of 800 mg/L for floating slime formation, although the limit for Bi was less clear. Furthermore, the structure of the synthetic floating precipitates produced were analyzed using both SEM-EDS and XRD and showed typical amorphous structure of floating slimes with particle size of approximately 25 µm and predicted composition of $BiAsO_4$, $SbAsO_4$, Sb_2O_3 and Bi_2O_3.