

Assessment of the floatability of chalcopyrite, molybdenite and pyrite using biosolids and their main components as collectors for greening the froth flotation of copper sulphide ores

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Abstract

Biosolids and representative compounds of their main components – humic acids, sugars, and proteins – have been tested as possible environment-friendly collectors and frothers for the flotation of copper sulphide ores. The floatability of chalcopyrite and molybdenite – both valuable sulphide minerals present in these ores – as well as non-valuable pyrite was assessed through Hallimond tube flotation tests. Humic acids exhibit similar collector ability for chalcopyrite and molybdenite as that of a commercial collector (Aero 6697 promoter). Biosolids show more affinity for pyrite. The copper recovery (85.9%) and copper grade (6.7%) of a rougher concentrate obtained using humic acids as main collector for the flotation of a copper sulphide ore from Chile, were very similar to those of a copper concentrate produced by froth flotation under the same conditions with a xanthate type commercial collector. This new and feasible end-use of biosolids and humic acids should be new environment-friendly organic froth flotation agents for greening the concentration of copper sulphide ore. Now, further research is needed in order to scale current laboratory assays to operational mining scales to determine efficiencies to industrial scale.

Keywords

Froth flotation agents; Sulphide minerals; Biosolids; Humic acids