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CHEMICAL OXIDATION INTEGRATED INTO BIOLEACHING OF PYRITE AND CHALCOPYRITE USING IMMOBILIZED BIOMASS

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Abstract

Chemical oxidation of pyrite and chalcopyrite by ferric sulfate ($Fe_2(SO_4)_3$) solution and biogenic ferric iron obtained by mixed culture of isolated thermotolerant *Acidithiobacillus* sp. 13Zn and *Leptospirilum ferriphilum* CC immobilized on natural carriers-zeolite and shungite was studied. Oxidation rate of sulfide minerals was estimated by the decrease of Fe^{3+} (oxidant) and increase of Fe^{2+} ions in the solution. It was revealed that chemical oxidation of chalcopyrite by biogenic ferric iron occurred 2-3 times more intensively than that by $Fe_2(SO_4)_3$ solution. Pyrite oxidation rate by biogenic ferric iron was twice higher than that by chemical ferric iron solution. It was shown that the treatment of pyrite and chalcopyrite by biogenic ferric iron allows to increase on average 1.5 - 2 times the bioleaching of iron from pyrite and iron and copper from chalcopyrite by the associations of iron and sulfur oxidizing bacteria.

Key words: Acidithiobacillus sp. 13Zn, biogenic ferric iron, chalcopyrite, chemical oxidation, immobilized biomass, pyrite

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