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A NEW AND COST-EFFECTIVE APPROACH FOR METALS RECOVERY FROM ACIDIC LEACHING LIQUOR WITH BACTERIAL CELLULOSE

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Abstract

Intense mining activities involving different mining sectors could generate a large amount of waste and environmental problems. In this study, Ca, Mg, Mn, and Fe recovery experiments were conducted as kinetic experiments with bacterial cellulose (BC) and 2⁴ factorial experiments with four different variables from a real leaching liquor. The acidic leaching liquor mainly consisted of 191.2 mg/L Ca, 108.42 mg/L Mg, 28.3 mg/L Mn, and 43.8 mg/L Fe. Kinetic experiments showed that the experimental results were coherent with the pseudo-second-order kinetics. The effect of four different variables at three different levels was investigated with the 2⁴ factorial design. BC concentration, pH, reaction time, and temperature were selected as variables. The results showed that the most effective factor in the recovery of all elements was pH. It was possible to recover 80–100% of all elements at high pH values. This might be due to the precipitation of elements at high pH values. Therefore, in order to evaluate the effect of BC, the recovery results at low pH values were considered, and approximately 25% Ca, 25% Mg, 35% Fe, and 27% Mn recovery was obtained at a concentration of 5 g/L BC, pH 3, with 60-min reaction time, and at 20°C.

Key words: acidic leaching, bacterial cellulose, kinetic, recovery

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