

Ozone Effect on Leaching Kinetics for the Recovery of Copper in Aqueous Ferric Chloride Solution from Chalcopyrite Mineral

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The leaching experiment was conducted at the condition of a concentration of slurry density 20 g/L of 0.1M FeCl₃ with 0.1M HCl aqueous solution under the condition of agitation of 500 rpm and temperature ranging from 50 to 99°C. The copper component included in the used chalcopyrite mineral concentrate was a 41.5% and showed the yield of 77% after the basic leaching. For the improvement of leaching efficiency, ozone was added to the leaching reactor. From the result, the leaching yield was increased to 90% at the same condition of the basic leaching. All the leaching mechanism was determined by shrinking core model with a constant size and the leaching rate was determined by product and ash layers diffusion as the overall rate determining step in the cases of basic and ozone leaching. On the other hand, in the case of ozone-assisted leaching, the rate was determined by the same mechanism. By using the Arrhenius expression, the apparent activation energy of the basic leaching was found to be 33 kJmol⁻¹ but the apparent activation energy of the ozone-assisted leaching was found to be 31 kJmol⁻¹.