

عنوان مقاله:

Investigation of leaching kinetics of zinc from a low-grade ore in organic and inorganic acids

محل انتشار:

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نویسندگان:

Seyed M. Seyed Ghasemi - School of Mining, Petroleum & Geophysics Engineering, Shahrood University of Technology, Shahrood, Iran

A. Azizi - School of Mining, Petroleum & Geophysics Engineering, Shahrood University of Technology, Shahrood, Iran

خلاصه مقاله:

The leaching kinetics of a low-grade zinc oxide ore in different acid media was investigated with respect to the experimental variables including acid concentration, temperature, liquid to solid (L/S) ratio, and stirring speed. The results obtained showed that the leaching reagent concentration and the reaction temperature exerted significant effects on the extraction of zinc, whereas the L/S ratio and stirring speed exhibited a relatively moderate effect on the leaching rate. The maximum leaching rate with inorganic acids was obtained to be 90.76%, while the maximum zinc recovery with citric acid was determined to be 88.68%. It was found that the zinc leaching process followed the kinetic law of the shrinking core model. It was distinguished that the dissolution rate was controlled by diffusion through the fluid film in the HNO₃ medium with the activation energy of 4.38 kJ/mol, whereas when dissolution was performed in the presence of HCl, H₂SO₄, and citric acid, an intermediate process (i.e. a physico-chemical process) was the rate-controlling step.

کلمات کلیدی:

Leaching Kinetics, Zinc Recovery, Low-Grade Oxide Ore, Shrinking Core Model

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