LEACHING KINETICS OF IRON IN ATMOSPHERIC DIRECT LEACHING OF MARMATITE

Zhifeng XU¹, Hui ZHU¹, Qingzheng JIANG¹, Chengyan WANG²

¹Jiangxi University of Science and Technology
86 Hongqi Ave.
Ganzhou, China 341000

²Beijing General Research Institute of Mining and Metallurgy
188 South 4th Ring Road West
Beijing, China 100070

ABSTRACT

The leaching kinetics of iron in atmospheric direct leaching (ADL) of marmatite is studied on the basis of orthogonal experiments. The effects of temperature, total pressure and particle size of concentrate on the leaching rate of iron in ADL process are firstly evaluated by the range analysis and variance analysis respectively. The controlling step for iron leaching is discussed under the following conditions: the temperature of 343-383 K, the slurry pressure of 0.3-0.7 MPa, the particle size of (-74 μm, +63 μm), (-63 μm, +44 μm), (100%-44 μm). The results show that the leaching of iron is controlled by mixed interface chemical reaction and diffusion and the apparent activation energy is calculated as 37.66 kJ/mol. The kinetic equation for iron leaching in ADL process is further established, which follows shrinking core model.

KEYWORDS

Kinetics, iron, atmospheric direct leaching, marmatite