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Review

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Influencing factors and kinetics analysis on the leaching of iron from boron carbide waste-scrap with ultrasound-assisted method

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ABSTRACT

In this paper, the ultrasound-assisted leaching of iron from boron carbide waste-scrap was investigated and the optimization of different influencing factors had also been performed. The factors investigated were acid concentration, liquid-solid ratio, leaching temperature, ultrasonic power and frequency. The leaching of iron with conventional method at various temperatures was also performed. The results show that the maximum iron leaching ratios are 87.4%, 94.5% for 80min-leaching with conventional method and 50min-leaching with ultrasound assistance, respectively. The leaching of the waste-scrap with conventional method fits the chemical reaction-controlled model. The leaching with ultrasound assistance fits chemical reaction-controlled model , diffusion-controlled model for the first stage and second stage, respectively. The assistance of ultrasound can greatly improve the iron leaching ratio, accelerate the leaching rate, shorten leaching time and lower the residual iron, comparing with conventional method. The advantages of ultrasound-assisted leaching were also confirmed by the SEM-EDS analysis and elemental analysis of the raw material and leached solid samples.

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