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The influence of microwaves on the leaching of sphalerite in ferric chloride

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Abstract: This work presents a study for the leaching kinetics of pure sphalerite crystals in acidic ferric chloride under conventional- and microwave-heated conditions. The effects of stirring speed, particle size, ferric chloride concentration and temperature were investigated. The shrinking core model was applied to the results of experiments. It was found that the reaction is controlled by chemical reaction with an activation energy of 44.8 kJ/mol. The order of reaction with respect to the ferric chloride concentration was found to be 0.62. The effect of microwaves on the leaching of sphalerite in acidic ferric chloride was also investigated. An enhancement on the zinc recovery was observed which was more apparent at stagnant conditions (rather than stirred) when compared to conventional leaching. It is suggested that this enhancement is due to the higher heating rates in the leaching solution at the walls of the leaching vessel.