

## Scale up possibilities for microwave leaching of chalcopyrite in ferric sulphate

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**Abstract:** This paper presents a study on the effect of reactor size on the microwave leaching outcome of copper from chalcopyrite in  $\text{Fe}_2(\text{SO}_4)_3 \cdot \text{H}_2\text{SO}_4$  solution. Microwave leaching experiments were carried out in single mode cavity using reactors of two sizes (20 and 50 mm in diameter). The results of microwave experiments were compared with those obtained under conventional conditions. It was found that the copper recovery obtained under microwave conditions in the large reactor is comparable to those obtained conventionally. On the other hand, the copper recovery was higher when leaching was carried out in small reactor. It is suggested that the enhanced recovery in the small reactor is due to the selective heating of chalcopyrite coupled with the effect of microwave penetration depth. Computational results also suggest that the portion of reactor volume affected by the high power density is higher in the small reactor. Furthermore, microwave heating of ferric sulphate leaching solution in vessels of different sizes suggests the presence of a super heated layer close to the vessel walls caused by a small penetration depth. Based on experimental and modelling evidence the implications for the scale up for microwave leaching of chalcopyrite are discussed.