

The Role of Sodium Alginate in the Selective Flotation of Chalcopyrite Against Pyrite

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Abstract : The selective depression of pyrite in the flotation of copper minerals is difficult due to the activation of pyrite surface by copper ions. Novel depressants for pyrite are needed to responsibly extract copper resources for a greener and cleaner future. In this paper, the non-toxic sodium alginate was employed as a depressant to selectively separate chalcopyrite from pyrite in flotation using potassium amyl xanthate as the collector. The results from flotation tests showed that sodium alginate significantly depressed pyrite flotation while had slight influence on chalcopyrite flotation. The adsorption tests showed that the adsorption amount of sodium alginate on pyrite surface was much higher than that on chalcopyrite surface. The pre-adsorbed sodium alginate could effectively hinder the subsequent adsorption of collector on pyrite surface, thereby inhibiting pyrite flotation. The selective adsorption of sodium alginate on pyrite surface was caused by the interactions between the activating cuprous ions on pyrite surface and the carboxyl groups in sodium alginate. The paper shows that sodium alginate is a promising depressant for pyrite in the flotation of chalcopyrite.

Keywords : chalcopyrite flotation, pyrite depression, sodium alginate, copper-activated pyrite, adsorption

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