

Phosphate removal performance of acid pickling milling wastewater from high-phosphate hematite mineral processing by activated red mud

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ABSTRACT

The acid pickling milling wastewater from high-phosphate hematite mineral processing should be treated and comprehensively reused on-line with a low pH value and a high phosphate removal. The absorbents, raw and different activated red mud (RM), named as RM- α , β , γ , δ , and ϵ , were firstly studied on the phosphate removing performances in this paper. During the treatment of the actual mineral processing wastewater with pH 2.50–2.53, the turbidity 600–800 NTU, and phosphate concentration 98.85 mg/L, the optimum dosage of raw RM, RM- α , β , γ , δ , and ϵ was 23.00 g/L, 22.50 g/L, 22.00 g/L, 23.50 g/L, 28.00 g/L and 20.00 g/L, respectively, and the phosphate removal was 92.47%, 99.39%, 99.32%, 99.42%, 98.56% and 99.66%, respectively, and effluent pH was 8.02, 3.93, 3.06, 3.82, 3.72, and 2.98, respectively. The results indicated that the activated red mud ϵ , or RM- ϵ , was the most suitable absorbent with the highest phosphate removal, the lowest dosage and pH value in the effluent.

Keywords: Acid pickling milling wastewater; Activation; High-phosphate hematite; Phosphate removal; Red mud

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