Removal of dianiline dithiophosphoric acid from wastewater by chelate precipitation

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ABSTRACT

Dianiline dithiophosphoric acid (also referred as aniline aerofloat) is an effective collector for mineral flotation and is widely used in China. It causes significant pollution in flotation process, and the degradation characteristics of aniline aerofloat were investigated in this study. Removal of aniline aerofloat from flotation wastewater was studied through chelate precipitation with copper sulfate and polysilicate aluminum ferric (PSAF). Under optimum conditions of copper sulfate 20 mg/L, PSAF 150 mg/L, and pH 8.5, the removal rates of aniline aerofloat, chemical oxygen demand (COD), and total phosphorus of wastewater can be more than 86%, 83% and 88%, respectively. The pH, COD, and residual concentration of copper ions of the wastewater after treatment meet the standards of direct emission. The mechanism of chelate precipitation was further examined, and infrared spectra confirm that copper ions chelate with the two sulfur atoms of aniline aerofloat. This study provides a potential way for dealing with the comprehensive management of mining wastewater.

Keywords: Aniline aerofloat; Flotation wastewater; Chelate precipitation; Organic phosphorus

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