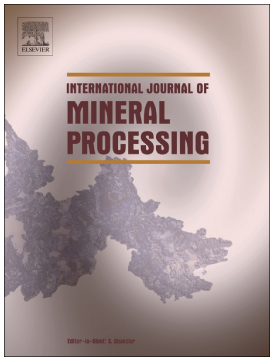

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A Fundamental Study of Octanohydroxamic Acid Adsorption on Monazite Surfaces

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Abstract: The adsorption mechanism of octanohydroxamic acid (OHA) on monazite was studied using kinetic, isotherm, and thermodynamic adsorption tests as well as FTIR, titration, and micro-flotation experiments. The adsorption mechanism was described as a chemisorption/surface precipitation process. At low OHA concentrations, adsorption occurred by chemisorption as a result of the reaction between surface active sites and OHA molecules. With an increase in concentration and interaction time, surface precipitation occurred. For chemisorption, adsorption was an exothermic and entropy driven process and maximum adsorption was achieved at pH 9.0 due to more active sites. In an acidic environment, such as pH 3.0, adsorption was achieved via chemisorption and hydrophobic bonding. However, a strong basic and higher temperature environment contributes to surface precipitation of basic rare earth hydroxamate. FTIR tests showed the movement of $-CH_2$ band position from 2924 cm^{-1} to 2920 cm^{-1} with increases in pH values from 3.0 to 6.0, 9.0, and 11.0, which corresponds to the status of chemisorbed and surface precipitated OHA, respectively.

***Keywords*:** Monazite, hydroxamic acid, adsorption mechanism, adsorption kinetics, flotation