

The depressing effect of kaolinite on molybdenite flotation in seawater

Ramirez A.

Gutierrez L.

Vega-Garcia D.

Reyes-Bozo L.

Copper-molybdenum grades of important mining deposits have progressively decayed, which is associated with high levels of clay minerals which affect froth flotation. The depressing effect of clay minerals on copper sulfides was previously reported but there are no systematic studies on the effect on molybdenite flotation in seawater. The objective of this work was to study the effect of kaolinite on molybdenite flotation in seawater and to evaluate the use of sodium hexametaphosphate (SHMP) as dispersant. The results of this work show that kaolinite depresses molybdenite flotation which is more significant in seawater at $\text{pH} > 9$. All the experimental data validate the hypothesis that kaolinite covers molybdenite, reducing its flotation recovery. The depressing effect of kaolinite on molybdenite flotation in seawater is enhanced by the magnesium and calcium hydroxo complexes at $\text{pH} > 9$, which induce heterocoagulation between kaolinite and molybdenite, thus reducing recovery. The attachment of the positively charged hydroxo complexes of magnesium and calcium to the molybdenite and kaolinite surfaces is diminished by SHMP. This reagent increases the repulsive forces between molybdenite and precipitates and as a result, molybdenite becomes more hydrophobic and recovery increases. © 2020 by the authors. Licensee MDPI, Basel, Switzerland.

Clays

Dispersants

Molybdenite

Seawater