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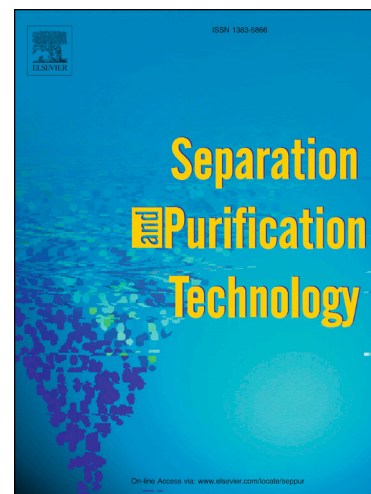
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# Interaction mechanism of magnesium ions with cassiterite and quartz surfaces and its response to flotation separation

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## Abstract

The interaction behavior and mechanism of magnesium ions with cassiterite and quartz surfaces and their effects on flotation separation of cassiterite from quartz were investigated by micro-flotation tests, surface adsorption experiments, zeta potential measurements, solution chemistry calculation, and X-ray photoelectron spectroscopy (XPS) analysis. The micro-flotation tests showed that solution pH significantly affected the floatability of cassiterite and quartz in the absence and presence of magnesium ions, and the preferred flotation separation of cassiterite from quartz was obtained at pH 6.8–8.2. Adsorption experiments and zeta potential measurements indicated that magnesium ions significantly affected the adsorption of sodium oleate on the mineral surface. The effect gradually aggravated with increasing pH due to the specific adsorption of hydrated  $\text{Mg}(\text{OH})^+$  and  $\text{Mg}(\text{OH})_2$  on the mineral surface. The adsorption mechanism of magnesium species onto the mineral surface was ascertained

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