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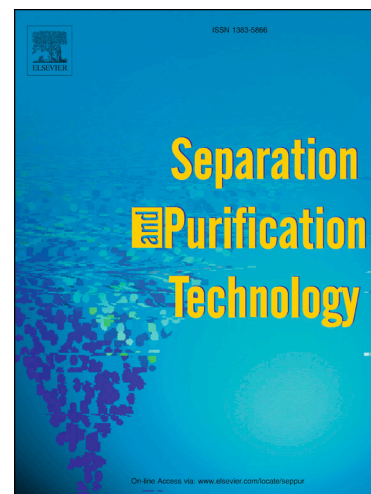
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Separation of scheelite and calcite using calcium lignosulphonate as depressant

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Abstract: The flotation separation of scheelite and calcite by froth flotation is difficult as these two minerals have similar physicochemical characteristics. To solve this problem, the role of calcium lignosulphonate (CLS) in the flotation separation of scheelite from calcite has been studied and the separation mechanism has been discussed. The micro-flotation tests show that calcium lignosulphonate has strong depression effect to calcite and the depression effect decreased with the increase in pH. However, its depressive effect to scheelite is weak at pH 6-9. A concentrate with WO_3 grade of 65.02%, and WO_3 recovery of 79.64% was achieved in the flotation separation of mixed mineral, while calcium lignosulphonate was used. The reason is that the adsorption amount of calcium lignosulphonate on scheelite surface is far less than that of calcite according to adsorption tests. The interaction mechanism of calcite and CLS was studied by XPS and the results shows that the interaction between calcite and CLS were chemisorptions, and this interaction that $-SO_3$ group were involved hindered the absorption between OH^- and the Ca^{2+} on the surface of calcite, it also shows that a small amount of $Ca(OH)_2$ was generated on the surface of calcite in the presence of CLS, the coefficient of these two mechanisms brings about the depression effect for calcite.

Key words: scheelite; calcite; calcium lignosulphonate; depression selectivity

1. Introduction

Scheelite ($CaWO_4$) is a typical tungstate mineral and usually coexists with the calcite ($CaCO_3$) and fluorite (CaF_2) in scheelite deposits, and flotation is the most

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