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Propyl gallate: A novel collector for flotation separation of fluorite from calcite

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Abstract: In real flotation systems, the flotation separation of fluorite from calcite is a challenge due to the similar surface properties of these two minerals. The purpose of this paper is to develop a highly selective flotation collector for calcium-containing minerals. Propyl gallate (PG) was introduced as a collector for selective flotation separation of fluorite from calcite. The separation of fluorite from calcite without using any depressant can be achieved by using PG as the collector. The flotation mechanism of fluorite and calcite was studied by zeta potential measurements, adsorption, FT-IR and XPS analysis. The results indicated that phenolic hydroxyls were the functional groups of PG, and the adsorption amount of PG on the surface of fluorite was larger than on calcite.

Keywords: fluorite; calcite; propyl gallate; separation; flotation.

1. Introduction

Fluorite is the only raw material needed for the production of hydrofluoric acid and is a non-renewable resource. Most fluorite ores have to be upgraded before entering the fluorite market, and the commonly used beneficiation process is flotation (Ayhan et al., 2013). The most commonly used collector for the flotation

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