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Selective adsorption of tannic acid on calcite and implications for separation of fluorite minerals

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Abstract:

Selective adsorption of tannic acid (TA) on calcite surfaces and the implications of this process for the separation of fluorite ore were studied by microflotation tests, surface adsorption experiments, zeta potential measurements, UV–vis analysis, and X-ray photoelectron spectroscopy (XPS) analysis. The microflotation tests indicated that TA, when added before sodium oleate (NaOl), could selectively depress calcite from fluorite at pH 7. Surface adsorption experiments revealed that TA hinders the interaction of NaOl with calcite. The zeta potential of calcite became more negative with TA than with NaOl. However, the characteristic features of TA adsorption were not observed on fluorite, suggesting that the dominant adsorption sites are dissimilar on the fluorite and calcite surfaces in the pulp. UV–vis spectroscopy, XPS, and solution chemistry analysis were utilized to obtain a better understanding of the mechanism for selective adsorption of TA as well as the key factors determined by the Ca^{2+} and $\text{Ca}(\text{OH})^+$ components on the mineral surfaces. A possible adsorption

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