

Development and Validation of Ore Characterisation Test and its Use in Variability Campaigns of Comminution Circuits

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Impact testing was developed by assessing the fragmentation characteristics of ore samples after controlled impact. Standard methods are, however, limited to relatively large and coarse samples, which thus precludes their use in early stages of projects, as well as where only drill cores are available. The method described in this paper is based on the same concepts of controlled ore breakage, but using relatively smaller samples. It is particularly useful in assessing the variability of ore characteristics in early stages of greenfield projects, as well as in predicting the performance of existing grinding circuits. A validation program was carried out in which a good adherence to the original test results was obtained. The results were used for (a) simulation of a copper comminution circuit as a function of the ore characteristics, and (b) evaluation of sampling protocols used for assessing fragmentation characteristics.

Keywords: comminution, ore testing, simulation, variability

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Concentration of Phosphate Ore by Flotation With/Without Desliming

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Froth flotation for separation of phosphate minerals from other gangue minerals has been practiced by fatty acid flotation with pine oil as a frother. The conventional phosphate flotation process, so called 'double float' process, includes anionic flotation fatty acid/fuel oil of the phosphate minerals at alkaline pH, followed by cationic 'reserve' flotation of silica from the initial phosphate concentrate with amine. In recent years, there are also many researches going on the concentration of phosphate ores by single-stage flotation due to the increasing demand stems from significantly lower cost, lower surfactant usage and better grade.

In this study, phosphate ore containing francolite as a main phosphate mineral was used and the concentration by single-stage flotation with a fatty acid derivative collector was studied. The effect of particle size and desliming method on the flotation was investigated in relation to the phosphate grade of concentrates produced. Feed particle size of 100 µm was found to be the most effective one. The best result was obtained with desliming even without flotation and a slime material assaying 38.1 per cent phosphate was produced as a concentrate.

Keywords: francolite, desliming, phosphate ore, fatty acid

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