

One More Solution to Dolomite/Apatite Separation Problem

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Abstract

Dolomite, (Ca, Mg) CO₃ represents a problematic impurity in phosphate deposits in different parts of the world. Generally, acidulation of phosphate rock requires a feed of less than 0.7% MgO content. Selective mining, to avoid high dolomite deposits, has been practiced by phosphate mining industry. Reduction of the MgO content in the phosphate rock to less than 1% has been the target of many studies in various academic and industrial laboratories. However, such goal has not been achieved at a commercial scale yet. Therefore, developing an efficient and economical method for separating dolomite from apatite is an effective way to extend the phosphate mine life. Intense scientific research is being directed towards the implementation of novel approaches dealing with the efficient removal of dolomite from phosphate. Reactive Flotation (RF) constitutes a novel technology for solving this problem. RF basically depends on the reactivity of carbonate minerals with acids in which the CO₂ gas generates. Encapsulating the liberated CO₂ gas at the surface via coating agent renders the particle more buoyant and easy to separate from phosphate. A major advantage is the selectivity of the separation, which is hard to achieve by conventional flotation or other methods for this type of ores due to the similarity of surface properties of apatite and dolomite. Researchers at the Particle Engineering Research Center at University of Florida have conducted systematic studies to develop this process and understand its underlying fundamentals. This presentation discusses such efforts and the obtained results.