

Evaluation of coarse particle flotation technology for spodumene

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ABSTRACT

With the increasing development of electric cars, mobile devices, and other electronics, the demand for battery material has also increased. As lithium is one of the critical materials to produce green batteries, its value has increased as has the need for its exploration and production. Fluidised bed technology can enhance the recovery and flotation efficiency of coarse particles. This has been successfully implemented on an industrial scale for many years using Eriez' HydroFloat® separator in the potash, phosphate and sulphide industries and most recently has been utilised for lithium minerals. Eriez HydroFloat® separator combines the principles of flotation and hindered settling in a fluidised bed to create a high capacity, highly selective flotation unit. A unique aeration system disperses ultrafine bubbles directly into the reagentised fluidised bed environment, significantly enhancing the bubble-particle collision rates. Additionally, having no axial mixing or froth zone, bubble detachment is greatly reduced. As a result, only minimal surface exposure is required for flotation, allowing the HydroFloat® to achieve high recoveries of poorly liberated particles up to 2 mm in diameter. The benefits of coarse particle flotation (CPF) vary depending on the position within the flowsheet. Early gangue rejection offers the most economic gains in terms of increased circuit capacity, reduced throughput and hence energy consumption in the grinding circuit and safer tailings disposal. A tailings scavenger approach enhances the overall plant recovery by recovering the coarse value-bearing particles that are lost to conventional flotation tailings. Combined with Eriez's CrossFlow® separators for precise size classification, both up front and back-end CPF units offer economic and environmental benefits to processing plants. This paper examines both scenarios using real test and plant data from various Eriez HydroFloat® installations for spodumene applications around the globe, along with calculations, to demonstrate these benefits.