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THE PRODUCTION OF HIGH PURITY BATTERY GRADE LITHIUM CARBONATE PRODUCT FROM LITHIUM BRINE SOURCES

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ABSTRACT

The rise in demand for low-cost, high-energy density, safe and reliable batteries for the EV market is driving process and flowsheet development to produce high-quality low-cost precursor materials.

Lithium is extracted from various feed sources around the world and is available for refining into a battery-grade product as lithium carbonate or lithium hydroxide. Differing geologies and upstream chemistry in particular present a broad range of “impurity fingerprints” in the feed solutions that will determine the number of processing steps we need to incorporate in the flow sheet to achieve the desired product purity. These challenging feeds require careful examination and testing to prepare optimal flowsheets for each application with primary focus on meeting the stringent purity requirements, whilst seeking a balance between capital and operating costs.

The lithium brines have a variable lithium content depending on each salt flat, and various impurities that are not desirable in the final product (such as calcium, magnesium, boron, sulphate, among others). The brine goes through a number of processing steps such as lithium extraction, concentration, refining and conversion to lithium carbonate to produce battery grade lithium carbonate.

With the use of sophisticated simulation software, test work and extensive technical know-how, robust flowsheets have been developed to produce battery grade lithium carbonate from a variety of brine feed sources. This paper briefly outlines the typical feed chemistries and corresponding flow sheet options, and the balance between purity, capital and operating expenditures during flowsheet development.

Keywords: *Lithium carbonate, crystallisation, product purity, brine*