

LieNA® The Next Step in Spodumene Refining

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ABSTRACT

Lithium Australia NL (ASX:LIT) has been actively developing a vertical integrated lithium production business and has been collaboratively working with the ANSTO Minerals Group (ANSTO) to develop lithium chemical processing technology since 2015. This collaborative approach, has led to the development of two lithium extraction and chemical production processes, including LIT's SiLeach® process for the treatment of lithium micas and LieNA®, a hydrometallurgical process for the extraction of lithium from spodumene mineral concentrates.

The LieNA® process offers a step change to conventional spodumene processing by removing the need for thermal conversion of spodumene from an alpha to beta state which is required by conventional lithium "conversion" to recover lithium from the spodumene matrix. LieNA® replaces thermal conversion with an alkaline pressure digestion of spodumene converting this to sodalite in the digestion residue. Lithium present in sodalite can then be selectively leached from the sodalite matrix with dilute acid. LIT's proprietary phosphate precipitation process can then be applied to recover lithium selectively from the leach liquor.

The LieNA® process has several advantages over conventional spodumene processing as the alkaline digest is suited to a fine particle feed unlike conventional conversion processes which have a specific feed size specification, as roasting takes place in rotary kilns with counter-current gas flow, and these are very sensitive to feed particle size. This sensitivity necessitates the relatively large particle size specified for commercial spodumene concentrates. This results in undersized particles reporting to tailings during spodumene beneficiation as they are not amenable to roasting. LieNA® also removes the need to produce sodium sulfate as a by-product, the sale or disposal of which may become a significant issue for conventional processes moving forward.

This paper provides an overview of the development of LieNA® and the opportunity this process offers for the production of lithium chemicals from spodumene mineral concentrates. Details will include alkaline digestion and conversion, sodalite washing, caustic recovery and lithium recovery from the converted sodalite residue. Flowsheet alternatives and the potential for reagent regeneration is also discussed.