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INCORPORATION OF BLACK MASS RECYCLING INTO A HYDROMETALLURGICAL REFINERY

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ABSTRACT

To maximise cash flow, typically, the highest grade material is processed early in the mine life, inevitably resulting in increasingly under-utilised refinery capacity over time. For an integrated nickel laterite mine and refinery, such as the proposed Sunrise Energy Metals project located in central NSW, the introduction of black mass from recycled Ni/Co-rich lithium-ion batteries represents an opportunity to better utilise an existing asset. Moreover, nickel and cobalt products with a proportion of recycled metal content are attractive to markets such as the European Union, where the reuse of the metals is mandated.

A conceptual process for incorporating Ni and Co from black mass has been developed. Bench-scale testwork on representative samples of Ni- and Co-rich black mass have established the optimum conditions for the recovery of Ni and Co and removal of foreign impurities (Li, F, P, organics) in the minimum number of steps to produce a material suitable for introduction into the refinery.

Keywords: black mass, recycling, lithium-ion batteries, nickel, cobalt