Design considerations for the Metal Dissolution process for production of battery grade metal sulphates

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The demand for battery-grade metal sulphates, which are key materials for lithium-ion battery manufacturing, is continually growing due to the rapid expansion of the EV market. One pathway to meet the industry demand quickly is via a metal dissolution process, which involves the dissolution of nearly pure metals (e.g. Ni, Co) from the existing operations or alloys containing these critical metals, and subsequent leachate purification. This is a proven and viable approach that offers producers an opportunity to enter the battery market faster compared to producing metal sulphates from primary or intermediate sources. This paper discusses the important process design considerations for each major processing circuit in the metal dissolution process, including: i) materials handling of raw metal or alloy feed, ii) metal dissolution reactor circuit, iii) neutralization, iv) purification, v) metal hydroxide precipitation, and optionally vi) crystallization. By addressing these design considerations, and de-risking through test work and process modelling, the performance and costs can be optimized, thereby enhancing the competitiveness in the rapidly evolving battery market.