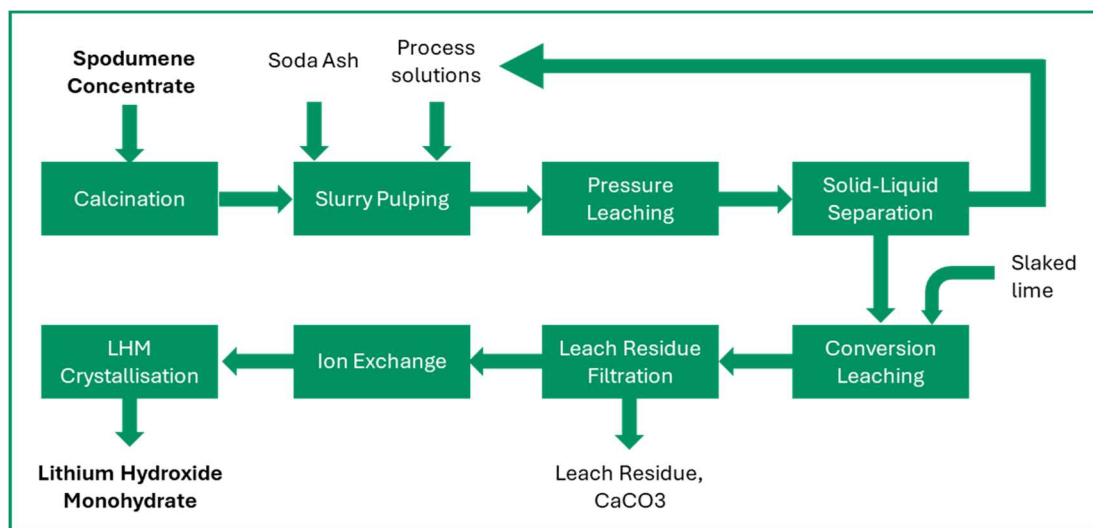


Techno-economic assessment of the alkaline leach process for lithium production from spodumene

Lithium is an essential critical raw material required for sustainable energy transition. Spodumene, the primary hard rock ore from which lithium is sourced, is mined, concentrated, and refined to battery-grade lithium hydroxide monohydrate (LHM) via different processing steps. Sulphuric acid roasting, followed by causticisation, is the industry-standard known process. However, due to the acid consumption in the sulphation process route, other alternative processes, such as the alkaline leach process, are being developed. In the alkaline leach process, calcinated spodumene concentrate is subjected to pressure leaching, followed by conversion leaching of the lithium carbonate to lithium hydroxide. The resulting lithium hydroxide solution is purified and crystallised to battery-grade LHM. Building on existing simulation-based life cycle assessment literature, estimating the economic impact of this novel technology is imperative.



In this thesis, a techno-economic assessment (TEA) of the alkaline leach process will be conducted to evaluate the process's economic feasibility, with a primary focus on the operating expenses. To achieve this, the following will be carried out:

- Literature study on the alkaline leach process for LHM production from spodumene concentrate,
- Techno-economic assessment of the process route,
- Sensitivity analysis on major economic intensive spots and comparison of the process to the industry-standard process route (TEA).

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