

# Lithium Extraction from Ore

## Low-Temp Process for Simultaneous Li Extraction, Energy Production and Decarbonization

### Overview

EVs and renewable energy are driving a surge in lithium (Li) demand. Li is mainly produced either by concentrating brines from salt lakes or by extracting it from ores, primarily  $\alpha$ -spodumene. Brine evaporation requires vast land, long processing times, and favorable climatic conditions. Ore processing requires roasting above 1000 °C, followed by intensive sulfuric acid leaching, leading to high energy and chemical consumption. Moreover, the co-dissolution of Si and Al impurities complicates downstream purification, increasing both economic and environmental costs.

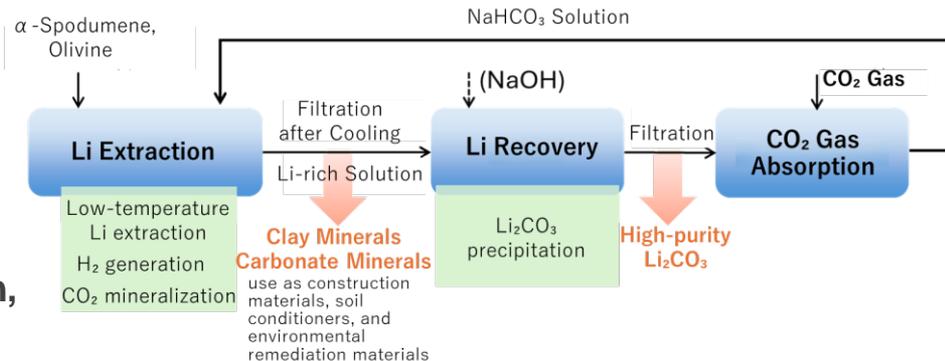
The inventors developed a hydrothermal process that controls element behavior, enabling simultaneous Li recovery, hydrogen (H<sub>2</sub>) production, and CO<sub>2</sub> mineralization at relatively low temperatures. For example, a NaHCO<sub>3</sub> solution with olivine enables efficient and sustained Li extraction from  $\alpha$ -spodumene at 300 °C. Impurities such as Si and Al are immobilized as secondary minerals, simplifying purification. Meanwhile, Fe(II) and Mg in olivine contributed to concurrent H<sub>2</sub> generate and CO<sub>2</sub> mineralization.

### Product Application

- Lithium production from ore

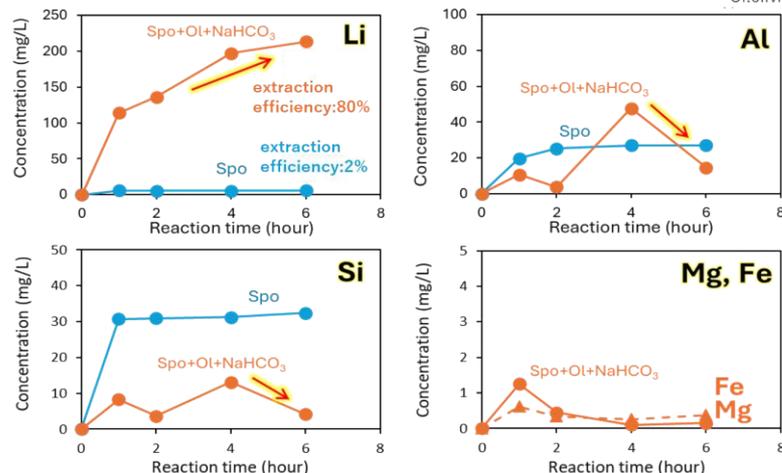
### IP Data

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 Admin No. : T25-062



### Efficient Li Leaching from $\alpha$ -Spodumene

Time-dependent change in element extraction concentration Spo:  $\alpha$ -spodumene  
Ol: olivine



In the  $\alpha$ -spodumene–NaHCO<sub>3</sub>–olivine hydrothermal system at 300 °C, Li extraction was markedly enhanced compared with pure water, reaching ~80% leaching within 6 h. In contrast, Al and Si leaching was suppressed, demonstrating high Li selectivity.

### Related Works

### Contact

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