Engineered Lithium-Ion Sieve Technology (E-LIST) for Direct Lithium Extraction and Lithium Hydroxide Production

YORK SMITH / UNIVERSITY OF UTAH

Project Summary

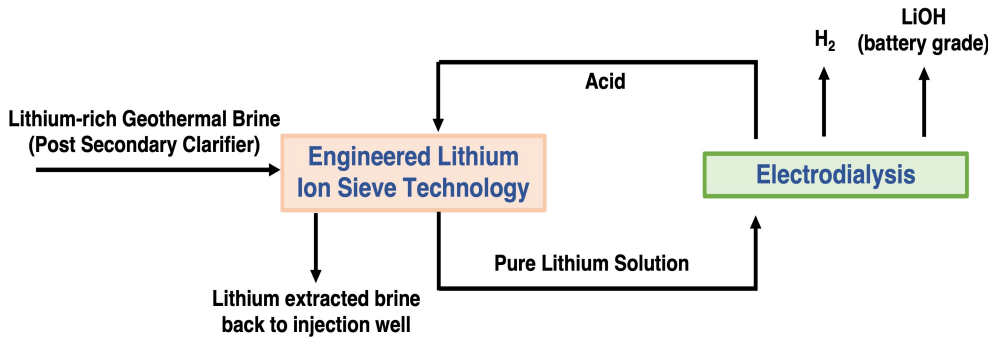
We will demonstrate the use of Engineered Lithium-Ion Sieve Technology (E-LIST) as an innovative, multi-resource capable, and low-impact processing method.

Our new innovative processing approach will produce battery grade lithium hydroxide while simultaneously regenerating processing reagents.

Project Impact

The study will establish a new paradigm in how lithium is extracted from resources enabling a wider range of lithium resources. The successful application of a selective hydrometallurgical purification and concentration technology specific to lithium would positively impact domestic resource efficiency.

The work aims to: i) recover lithium from resources with >90% purity, ii) reduce reagent consumption and waste generation by 25%, and iii) lower operating costs compared to conventional brine and mineral processing baseline processes.



Engineered Lithium-Ion Sieve Technology (E-LIST)

- Non-evaporative recovery process
  - Saves water
- High flexibility in brine chemistry
- Highly selective toward Li over other competing ions
- High cyclability/reusability
- Sorbent manufactured from waste materials
  - Inexpensive material cost

New Innovative Processing Approach

- Electrochemical process to produce battery grade lithium hydroxide
- Low power consumption
- Reagent regeneration and recycling loop
- Hydrogen production is a by-product
  - Can be sold to improve economics

Key Personnel/Organizations

York Smith & John McLennan

University of Utah

Greeshma Gadikota

Cornell University

Michael A. McKibben

University of California, Riverside