

## Specialty Nanofiltration Membranes for Lithium Extraction and Recovery from Brine

This project focuses on developing specialty nanofiltration membranes for lithium extraction and recovery from brine, addressing critical challenges in direct lithium extraction. Leveraging thin-film composite and thin-film nanocomposite membranes, the technology enhances Li/Mg selectivity, improves lithium purity (>95%), and reduces energy consumption. The membranes offer high permeability, fouling resistance, and long-term stability, making them a cost-effective and scalable solution for lithium-rich brines, particularly in Alberta’s oilfield brines. The project aims for pilot-scale validation, contributing to sustainable lithium production and Alberta’s leadership in the critical minerals industry.



**RECIPIENT:**  
**University of Alberta**



**PARTNERS:**  
**Volt Lithium Corp.**  
**Pathways Alliance**  
**NSERC**



**TOTAL BUDGET:**  
**\$500,000**



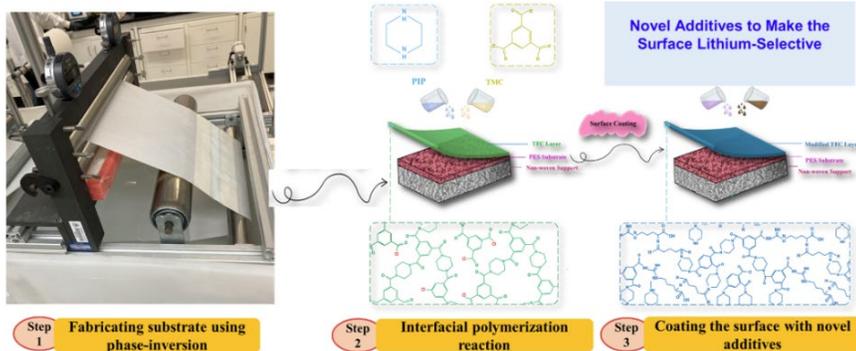
**AI FUNDING:**  
**\$200,000**



**PROJECT DATES:**  
**FEB 2025 –**  
**APR 2028**



**PROJECT TRL:**  
**Start: 3**  
**End: 5**



### APPLICATION

This project applies nanofiltration membrane technology to enhance lithium extraction and recovery from brine, particularly in Alberta’s lithium-rich reservoirs. The developed thin-film composite and thin-film nanocomposite membranes improve Li/Mg selectivity, lithium purity (>95%), and fouling resistance while reducing energy consumption and operational costs. By integrating these membranes into direct lithium extraction processes, this innovation supports sustainable, scalable, and cost-effective lithium production, advancing Alberta’s role in the critical minerals sector.

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## PROJECT GOALS

- To develop high-performance nanofiltration membranes to improve the efficiency and sustainability of lithium extraction from brines, including those from Alberta.
- Membranes are targeting >95% lithium purity, enhanced lithium selectivity, fouling resistance, and improved energy efficiency for brine processing.
- The membranes will be lab-tested to assess performance, and bench tested against existing commercial membranes on real brines.
- Membranes will be characterized for the purposes of commercial scaling.

## BENEFITS TO ALBERTA

- Seeks to enhance lithium extraction and improve energy efficiencies associated with direct lithium extraction in brines.
- Reducing operational costs associated with lithium recovery in direct lithium extraction processes.
- Membranes will be tested using real lithium bearing brines from Alberta.
- A patent field for the novel membrane technology developed for extraction and specialized filtration.
- Industrial collaboration between the lithium extraction technology industry and academia.
- Highly skilled workers trained in specialized filtration membrane fabrication and use.



3 Papers  
Published



3 Students  
Trained



1 New Project Job



1 Patent Filed



4 Future Jobs



1 New Product

CURRENT  
STATUS

March 2025 – Project in progress