ALBERTA INNOVATES

CLEAN RESOURCES

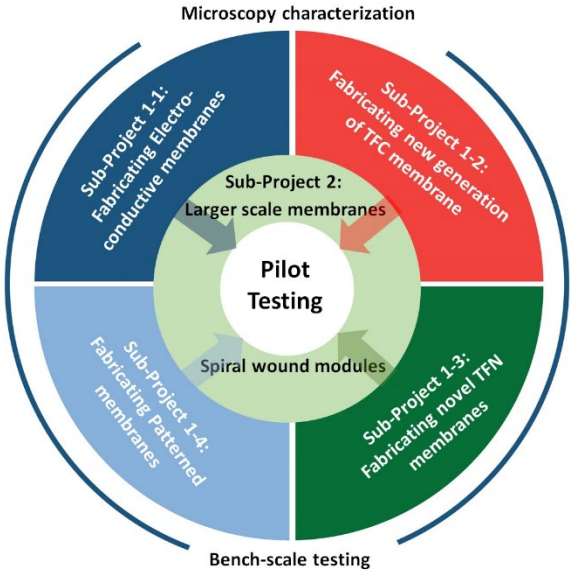
ENVIRONMENTAL INNOVATION

WATER INNOVATION

FUNDING DETAILS

Manufacturing gravity-driven membrane elements for high-quality water production for rural, Indigenous, and remote communities

Microfiltration and ultrafiltration technologies are viable solutions to produce potable water, free of viruses, bacteria, and organic matter, for remote communities. However, a major challenge for the sustainable operation of these membrane systems in remote areas is the need for electrical power and management of fouling. This project's scope will be to develop a roll-to-roll membrane manufacturing process to produce large-scale, gravity driven, porous membranes using lignin, carbon nitride, and metalorganic frameworks. Manufacturing these membrane modules offers some advantages over conventional membranes regarding biodegradability, lower fabrication costs and reduced fouling.



RECIPIENT:
University of Alberta

PARTNERS:
NSERC, COSIA, CRIN

TOTAL BUDGET:
$1,349,000

AI FUNDING:
$650,000

PROJECT DATES:
APR 2023 – MAR 2026

PROJECT TRL:
Start: 4
End: 7

APPLICATION

The initial market for the project technology is water treatment in rural, remote and Indigenous communities that can take advantage of the gravity driven aspect of the membrane. The membrane has broader potential application for treatment of wastewater produced in many industrial processes such as petroleum refining, food processing, and pulp and paper.

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PROJECT GOALS

This project aims to develop an energy-efficient membrane system to produce clean and safe drinking water for rural, Indigenous, and remote communities. Specific objectives include:

- O1: Manufacturing large-scale nanocomposite MF/UF flat sheet membranes utilizing lignin, MOFs, and C3N5, enabling them to operate at very low pressure
- O2: Manufacturing spiral wound membrane modules equipped with these nanocomposite membranes.
- O3: Implementing a grid-independent water treatment system

BENEFITS TO ALBERTA

While remote and Indigenous communities are the early adaptors of the proposed technology, the market within Alberta could be wastewater treatment in three sectors: residential, agricultural, and industrial. Hence, Alberta's municipalities, agricultural water treatment systems, mining, and pulp and paper industries, as well as water treatment EPC companies, can benefit from the results of this project. Our modification method using advanced nanomaterials and biopolymer increases the membrane's longevity and performance and thus produces higher-quality water for long-term operation. This will strike immediately, directly, and forcefully at contributing to economic diversification and growth in Alberta.

32 Publications

8 Students Trained

2 Patents

2 Project Jobs

12 Future Jobs

2 New Products/Services

1 Spinoff Companies

CURRENT STATUS

JUN 2023

This project was recently kicked-off. The first milestone will be complete in May 2024.