ALBERTA INNOVATES

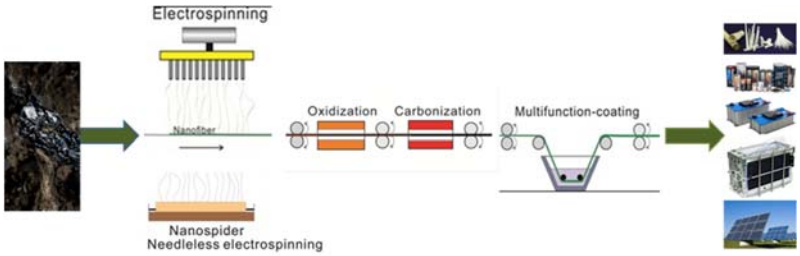
CLEAN RESOURCES

ADVANCED HYDROCARBONS

INNOVATIVE HYDROCARBON PRODUCTS – BITUMEN BEYOND COMBUSTION

Development of Alberta Oilsands Asphaltene (AOA)-based Carbon Fibres

The level of interest in Asphaltene-based Carbon Fibre (ABCF) is evident in recent governmental, industrial, and academic projects. However, due to production cost and performance, the current state-of-the-art in ABCF does not lend itself to structural applications. Thus, we propose to broaden application space of Alberta Oilsand Asphaltene (AOA) by improving the structural and functional properties of AOA-CF. In addition, we plan to close the knowledge gap between bench scale products and functionalized fibre product reality through the development of industrial scale manufacturing technology. By uncovering fundamental mechanisms governing spinning, while connecting the feedstock suppliers with end product manufacturers, the research team will accelerate the precommercial demonstration of new AOA-CF products.



FUNDING DETAILS

RECIPIENT:
University of British Columbia

PARTNERS:
CRIN

TOTAL BUDGET:
$1,027,463

AI FUNDING:
$45,000

PROJECT DATES:
AUG 2021 – JAN 2023

PROJECT TRL:
Start: 2
End: 5

APPLICATION

The applications of the new AOA-CF products include advanced hybrid composites for functional applications, such as electromagnetic shields, fuel cells, supercapacitors, and battery electrodes, and structural applications, such as automobile and construction fibre reinforced composites. As a result, these products will enhance and accelerate Canadian economic growth and exports in key technological areas.

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PROJECT GOALS

The goal of the project is to increase the value of AOA by improving the structural and functional properties of AOA-CF through unique processing, polymer blends and/or nano-reinforcement. The outcome will demonstrate the potential of AOA-CF composites as a unique engineering material. We believe that by combining the advantages of nanofibres and the polymer blend, a new class of low-cost CF (LCCF) and fibrous assemblies can be developed for structural applications, and functional applications. With the production of LCCF, there will be an increased use in the automotive industry rather than the aerospace industry. In addition, there are many new applications of CF-based composite which are not yet commercially feasible as they are expensive and low cost solutions from AOA may deliver the right performance/cost ratio.

BENEFITS TO ALBERTA

There are increased concerns related to climate change, environmental issues and carbon intense energy. Developing alternative applications outside of combustion of AOA could help transition AOA to applications for useful and longer-term storage. The benefits can come from converting the low-value by-products of traditional AOA processes to create new high value-added products. With its vast resources, the development of innovative products and technologies from AOA can offer a made-in-Canada solution for alternative carbon fibre. New markets will boost the economics of the related industries in not only Alberta but across Canada.

2-3 Publications

2-3 New Products/Services

1-2 Patents

10-100 Future Jobs

CURRENT STATUS

AUG 2022

The AOA purification has been scaled up towards the 10g a day carbon fibre production target. In the meantime, the pilot scale fibre spinning has been studied producing fibre at both the submicron and micron level.

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