

Preparation and Characterization of Carbon Fibres from Alberta Bitumen Pitch

Pitch derived from oil sands bitumen is more than an order of magnitude less costly than typical carbon fibre feedstocks, e. g. polyacrylonitrile (PAN). This cost difference provides an ‘economic opportunity’.

Carbovate and partners aim to investigate converting Alberta oil sands bitumen derived straight-run vacuum tower bottoms (pitch) into a feedstock suitable for manufacturing general-purpose carbon fibre (GPCF). The focus is on determining whether and through which processes carbon fibre precursor material for GPCF manufacturing may be produced in a cost-effective manner from Alberta bitumen for high volume carbon fibre applications.



RECIPIENT:

**Carbovate
Development Corp.**



PARTNERS:

**Lambton College,
Bowman Centre for
Sustainable Energy,
Toronto Zenith**



TOTAL BUDGET:

\$312,000



AI FUNDING:

\$65,000



PROJECT DATES:

**MAY 2020 –
DEC 2021**



PROJECT TRL:

**Start: 2
End: 4**

APPLICATION

The intent is to create a new market for Alberta bitumen in the form of carbon fibre pre-cursor material and low-cost, general purpose carbon fibre to be used in markets such as the automotive and concrete reinforcement industry sectors where high-volume use of current carbon fibre is not feasible due to high cost. This opportunity may provide a path toward a new high tech, high value industry for Alberta.

ALBERTA INNOVATES CLEAN RESOURCES

ADVANCED HYDROCARBONS

INNOVATIVE HYDROCARBON PRODUCTION – BITUMEN BEYOND COMBUSTION

PROJECT GOALS

The key goals are:

- Developing a process to obtain a precursor material suitable to manufacture general purpose carbon fibre from thermally processed Alberta bitumen;
- Determining the properties and performance characteristics of the treated pitch filaments and any derived carbon fibre;
- Establishing whether the carbon fiber meets the performance requirements for general purpose carbon fibre – low to medium performance carbon fibre;
- Assessing whether the processes identified to produce the carbon fibre precursor material are expected to lead to cost-effective production on a large scale.

BENEFITS TO ALBERTA

Successful application of the knowledge generated, and implementation of the technology developed could result in:

- Commercialization of new, Alberta bitumen-based, value-added products: carbon fibre (CF) precursors
- Development of a pathway for a new Alberta high-tech industry sector: cost-effectively manufacturing of CF precursors and CF. High-volume low-cost carbon fibre manufactured in Alberta could lead to a new Alberta industry sector based on bitumen raw material; resulting in advanced materials including CF composites, and high paying jobs;
- Opening of new markets for Alberta bitumen: production of carbon fibre precursor and carbon fibre from Alberta bitumen would open new markets for that resource.
- Potential reduction of Alberta's GHG footprint: vacuum tower bottoms, a major component of bitumen, would be diverted from the fuels pool to durable goods.



1 Patent



**1 New
Product/Service**



**11-100 Future
Jobs**



**10 kT/yr Future
GHGs Reduced**

CURRENT STATUS

MAY 2021

Project launched in May 2020. Project execution has been delayed due to COVID-19 restrictions. Initial results are forthcoming.