

CLEAN RESOURCES

ADVANCED HYDROCARBONS

INNOVATIVE HYDROCARBON PRODUCTION – BITUMEN BEYOND COMBUSTION

FUNDING DETAILS



CARBON FIBRE GRAND CHALLENGE

The Carbon Fibre Grand Challenge ('CFGC') is a \$15 million three-phase competition with the objective of accelerating the development of large-scale production pathways for short and continuous carbon fibre from bitumen-derived asphaltenes and promoting their use in manufactured products.

The CFGC is part of an initiative by Alberta Innovates to further the development of non-combustion products and their production technologies, derived from bitumen contained in Alberta's oil sands. At present, most bitumen products are destined for energy generation by combustion (such as gasoline, diesel, and heating oil).

PHASE I GOALS

- Advance concepts and ideas for manufacturing carbon fibre from AOA while addressing the knowledge gaps identified by Alberta Innovates
- Conceptualize and potentially test pathways for manufacturing carbon fibre from asphaltenes with a line of sight to full development of the manufacturing pathway in Phase II
- Expose research teams to asphaltenes obtained from bitumen



RECIPIENT:
19 awardees



LOCATION:
Alberta – 8
Canada – 6
International - 5



TOTAL BUDGET:
\$1.4 million



AI FUNDING:
\$941,630



PROJECT DATES:
JULY 2020 –
Q1 2021



PROJECT TRL:
Start: 2
End: 4

CARBON FIBRE APPLICATIONS

Carbon Fibre ('CF') is one of the identified products that could be made from bitumen. The high strength and stiffness of CF, coupled with low density and high corrosion resistance, make composite materials that incorporate CF functionally superior to many conventional metals, wood products, and commercial polymers for use in electric vehicles, transportation, infrastructure, construction, and consumer products sectors. Current demand for carbon fibre is constrained by the high costs of feedstocks and production technologies but by using asphaltene feedstock from Alberta bitumen the input material cost should drop substantially enabling low cost carbon fibre to be manufactured.



ALBERTA INNOVATES CLEAN RESOURCES

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PHASE I AWARDEES

- Auburn University
- Chemventive
- Deakin University
- Georgia Tech Research Corporation
- NORAM
- McGill University (2 projects)
- National Research Council of Canada
- Ryerson University
- University of British Columbia
- University of Calgary (4 projects)
- University of Alberta (4 projects)
- Zetetic Associates

PHASE I OUTCOMES

- Researchers developed multiple different process pathways to manufacturing carbon fibre from asphaltenes
- Multiple research teams generated carbon fibre
- Carbon fibre performance properties in Phase I showed promising progress towards the desired performance targets set for Phase II and III
- Teams became familiar with asphaltene use and handling
- Teams began developing strategies for optimizing the input asphaltene feedstock
- Commercialization timeline of the latter half of the 2020s is still on target based on the progress in Phase I

Key Phase I Performance Indicators



**32 Students
Trained**



**10 Patents
Pending**



19 Publications



4 Project Jobs



**2 Sector HQSP
Trained**



**4 New
Products/Services**



**4 Partnership
Agreements / MOUs**



**21 Unique Products
/ Processes**

**CURRENT
STATUS**

APRIL 2021

Phase I projects are now complete. Phase II applications are underway with funding decisions to be made in Q2 2021.