UNIVERSITY OF WYOMING
Wyoming Technology Transfer and Research Products Center

Fabrication of Carbon Foam from Biomass Using High Pressure Pyrolysis

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Inventor:
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Patent Status:
Patent Pending

Description of Technology

Carbon foam is a highly porous, carbonaceous solid with properties that make it favorable and promising for a wide array of high value applications. The attractive properties of carbon foam include light weight, oxidation and corrosion resistance, low thermal expansion, and adjustable thermal and electrical conductivity. Carbon foam is a great material, but conventional methods for producing it use nonrenewable resources such as asphalt, plastic, or coal.

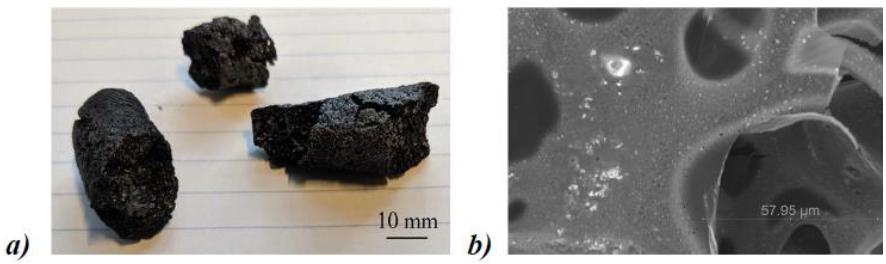
Researchers at the University of Wyoming have invented a new way to produce carbon foam that overcomes the shortcomings of the current methods by using a relatively simple and environmentally benign supercritical CO2 pyrolysis. Researchers use corn stover, an environmentally friendly and renewable material consisting of corn leaves, stalks, and cobs left in the field after harvest, to produce carbon foam. Creating carbon foam out of nonfood biomass is a far more environmentally friendly and renewable option than conventional methods. There is also minimal to no preprocessing of the feedstock before the pyrolysis which reduces the amount of energy put into the total process. The carbon foam produced from this process has as an insensitivity to moisture, volatile content, and particle size, and has properties comparable to carbon foams made from state-of-the-art methods. The new method can also generate and collect bio-oils while the pyrolysis is occurring, allowing for an additional revenue stream. This technology has the potential to dramatically transform carbon foam production by providing a simple and environmentally benign path to bioderived carbon foam.

Applications

Carbon foams are well-suited for applications such as fire and thermal protection, fuel cell anode and cathode gas diffusion layers, catalyst and refractory support, and batteries. This technology also produces bio-oils as an additional product which leads to more revenue streams to increase profit margins.

Features & Benefits

- Environmentally friendly and benign
- Insensitive to moisture, volatile content, and particle size
- Produces bio-oils as an additional product
- Minimal to no preprocessing of the feedstock before pyrolysis
- Comparable properties to carbon foams made with state-of-the-art methods



Figures: a) Macroscopic and b) SEM images of carbon foam produced from milled corn stover powder via supercritical CO_2 pyrolysis. Macro-, meso-, and micro-pores are visible by SEM

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