



Superabsorbent, Sustainable Aerogels

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WARF: P140038US02

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing organic aerogels that can absorb extreme amounts of oil, organic solvents and heavy metals.

Overview

Aerogels are the world's lightest solid materials made by removing liquid from gels. Such materials may contain up to 99 percent air and have special properties like high porosity and absorption.

One promising application for aerogels is environmental cleanup. They could be used to purify water contaminated with crude oil, fuel, organic solvents and metals like lead and mercury.

The Invention

UW–Madison researchers have developed organic aerogels with excellent absorbent properties. They are made by combining a water soluble polymer and cellulose nanocrystals/nanofibers (CNFs) derived from biomass. The polymer, such as PVA (polyvinyl alcohol), is cross-linked to form a gel and then water is removed by freeze-drying. The surface of the aerogel is coated with an organosilane, making it highly water repellent and superoleophilic ("oil loving").

Applications

- Water purification
- Oil spills and industrial cleanup
- Heavy metal ion scavenging

Key Benefits

- Highly porous, lightweight and sustainable
- Absorbs huge amount of oil and organic solvent (up to 100 times its own weight)
- High compressive strength and ultralow density
- CNFs are derived from biomass.
- PVA is a cheap synthetic polymer with excellent biocompatibility.
- Freeze-drying is a green, inexpensive and scalable process.

Stage of Development

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Additional Information

For More Information About the Inventors

- [Shaoqin Gong](#)

Related Technologies

- [WARF reference number P120283US03 describes sustainable organic aerogels for use in insulation.](#)

Publications

- [View a news story about this technology.](#)

Tech Fields

- [Clean Technology : Monitoring, remediation & waste reduction](#)
- [Materials & Chemicals : Composites](#)
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