



Sustainable Organic Aerogels for Insulation

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing methods for producing aerogels that contain nanoscale cellulose fibers and are suitable for an array of applications.

Overview

Aerogels are the world's lightest solid materials made by the removal of liquid from gels. Such materials may contain up to 99 percent air and combine unique properties like high porousness and excellent thermal, acoustic and electrical insulation.

Researchers have conventionally focused on making inorganic aerogels from silica, clay and metal oxide, and these materials have found use in clothing, building insulation and aviation. NASA, for instance, has developed silica-based aerogels for thermal insulation of spacesuits and Mars rovers.

However, inorganic aerogels often suffer from intrinsic brittleness, which limits their usefulness when tough, low-density materials are required. Also, the supercritical drying process used to make aerogels requires the use of organic solvents, which also is challenging to scale up.

The Invention

UW–Madison researchers have developed hybrid organic aerogels with desirable insulation properties. They are made by combining a water soluble polymer and a carbon nanofiller such as graphene oxide nanosheet with cellulose nanofibrillated fibers (CNFs) derived from biomass. The organic polymer, such as polyvinyl alcohol (PVA), is cross-linked to form a gel and water is removed by freeze-drying. The surface of the aerogel can be further modified.

Applications

- Green building insulation materials
- Aviation suits and planes
- Packing materials and shipping containers
- Life jackets, clothing and blankets
- Filters
- Industrial cleanup

Key Benefits

- Highly porous and lightweight
- High compressive strength and strain-to-failure value
- Excellent insulation properties
- Cellulose nanofibrillated fibers are derived from sustainable biomass.

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- Freeze-drying is a green process.
- Aerogels may highly repel or absorb moisture.

Stage of Development

The development of this technology was supported by WARF Accelerator. WARF Accelerator selects WARF's most commercially promising technologies and provides expert assistance and funding to enable achievement of commercially significant milestones. WARF believes that these technologies are especially attractive opportunities for licensing.

Additional Information

For More Information About the Inventors

- [Shaoqin Gong](#)

Publications

- [Read more about cellulose nanofibrils.](#)

Tech Fields

- [Materials & Chemicals : Composites](#)
- [Materials & Chemicals : Other materials & chemicals](#)

For current licensing status, please contact Jennifer Gottwald at jennifer@warf.org or 608-960-9854

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