

Applications

- Production of large aerogel monoliths with custom shapes
- Thermal and acoustic insulation
- Various industrial, architectural, and engineering applications possible
- Ballistic protection
- Body part protection from mechanical shock or temperature extremes

Advantages

- Easy synthesis: one pot, no solvent exchange
- Faster production
- Creation of larger, 3-Dimensional structures
- Mechanically robust if required
- Stronger than Kevlar on a per weight basis
- Insulation and shock absorbent properties

Inventors

[Massimo Bertino, Ph.D.](#)

Contact

T. Allen Morris, Ph.D., MBA
Associate Director
amorris5@vcu.edu
Direct 804-827-2211

Market Need

Aerogels are used for a wide variety of applications, yet they are still limited by certain aspects of their production. One of the most prohibitive steps of manufacture is solvent exchange. This step is usually necessary because the solvents used in the wet gel formation cannot be present when the aerogel is being supercritically dried to preserve its porosity. Solvent exchange adds expense due to the amount of fresh solvent needed for complete exchange. In order to ensure complete diffusion, the solvent exchange process is very time consuming and limits the size of aerogel that can be produced.

Technology Summary

Dr. Massimo Bertino has developed a new method that allows for larger monoliths to be formed in a shorter amount of time. This process uses supercritical ethanol during the drying process, and due to a modification in the wet gel chemistry, does not require solvent exchange. Without the need transfer to fresh solvent batches, the process becomes more cost efficient and synthesis can be performed in a single step. With this method, the size of the monolith is no longer limited by the time required for complete solvent exchange. If required, Cross-linking with a polymer can be carried out to increase the mechanical strength of the monoliths without any increase in processing cost or time. The increased strength expands the applications to include ballistic protection, shock absorption, and thermal protection. Functionally graded, honeycomb sandwiched and cellular solid structures can also be produced.

Technology Status

Bench-scale manufacturing has been successfully carried out with this method.

Patent Pending: U.S. and foreign rights available.

This technology is available for licensing to industry for further development and commercialization.