

Nanotechnology - Aerogels

Research Topics

- Polymer-crosslinked aerogels (X-aerogels)
 - As mechanically strong lightweight materials
 - As starting materials for nanoporous metals and ceramics
- Polymeric and Carbon Aerogels
 - Polyureas, polyurethanes, polyimides, polyamides, phenolic resins, polybenzoxazines, polydicyclopentadiene
 - Nanostructure - monomer relationships
 - Superelastic and shape-memory nanoporous polymers
 - Thermal insulation
 - Carbonization: mechanisms and CO₂ sequestration
- Nanoporous Metals, Carbides, Nitrides, Borides
 - Carbothermal reduction of polymer-crosslinked aerogels
 - Nanoporous metal catalysts and thermites (Fe, Co)

Facilities

SS-NMR, Porosimetry, Rheology, DMA, Instron thermal cond.

PoC

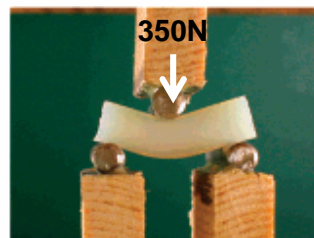
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Funding (last 5 years)

- ARO, NSF, DOE, BASF

X-Aerogel



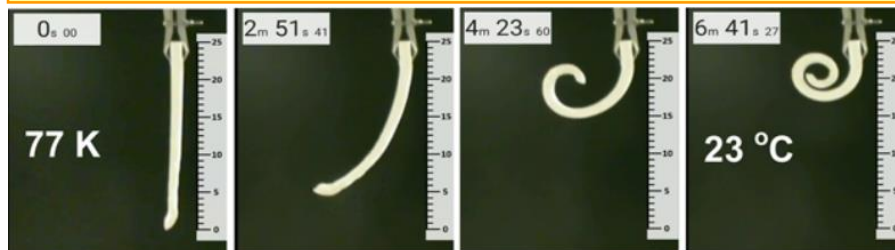
Fe-explosive



Co-thermite



PIR-PUR Shape Memory Aerogels



Keywords

- Nanoporous, Polymers, Metals, Ceramics, Nanocomposites, Shape-memory Polymers, Thermites, C-Supported Catalysts, CO₂ sequestration

Recognition/Significant achievements (Jan 2019)

- 186 publications, 16 Book Chapters, 28 U.S. Patents
- Co-Editor: Aerogels Handbook (Springer, 2011)
Springer Handbook of Aerogels (2019)
- 7,284 citations – h-index:46