

Polymer based silica aerogel production and optimization for thermal insulation applications

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This research proposes to develop innovative solutions for manufacturing lightweight thermally insulative polymer-based silica aerogel with the presence of carbon body filler with improved mechanical properties such as toughness and stiffness. This study will scientifically investigate micro- and nano-scale-tailoring of carbon body influence on the material properties, optimizing their nano- micro-scale structure design (cross-link density, type, and location), and modeling/analysis of structure-property relationships of the final roduct. Successful completion of the proposed research program will give our industry partner preliminary guidelines by which to manufacture advanced and functional polymer/carbon-based silica aerogel. With their exceptional thermal insulation, and mechanical properties, these aerogels will broaden the spectrum for insulation material usage in numerous and varied industries.

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Research Area: Hybrid polymer based aerogel