

Preface

The proposed monograph is about silica aerogel composites. Silica aerogels are known for their excellent thermal insulation properties in many industrial applications. This monograph explores novel but practical approach to fabrication of silica aerogel composites so as to push their application boundaries beyond thermal insulation.

Protein-based silica aerogel composites are fabricated via inexpensive and feasible methodologies. These products exhibit polymeric foam-like behavior consisting of high compressibility, superhydrophobicity, and excellent strain recovery in addition to the low thermal conductivity and density. The fabrication methodologies are explained in detail and comprehended as flowcharts for reference. This monograph will give readers another perspective to composite fabrication other than the known traditional ones and explore the endless ways of altering the compositions to modify the properties of the silica aerogel composites. Applications of these new and novel composites could be diverse and range from pharmaceutical to aerospace to oil and gas industries.

This monograph comes with detailed schematic illustrations, experimental techniques employed, and results and predictive models to tailor a specific property for the composites. Detailed analysis of experimental results with theoretical models and numerical simulations are one of the features of this monograph. Schematic diagrams on the ductile ‘phenomenon’; not usually associated with brittle silica aerogels are explained providing details on the mechanism and rationale for such material behavior. The monograph ends aptly with the study on sound absorption quality of the novel composites.

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Silica Aerogel Composites

Novel Fabrication Methods

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