Multifunctional Nanofiber Based Aerogels: Bridging Electrospinning with Aerogel Fabrication

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Abstract : We present a facile and sustainable solid templating approach to fabricate highly porous, flexible and superhydrophobic aerogels of composite nanofibers of cellulose diacetate and silica which are produced through sol gel electrospinning. Scanning electron microscopy, contact angle measurement, and attenuated total reflection-Fourier transform infrared spectrometry are used to understand the structural features of the resultant aerogels while thermogravimetric analysis and differential scanning calorimetry demonstrate their thermal stability. These aerogels exhibit a self-supportive three-dimensional network abundant in large secondary pores surrounded by primary pores resulting in a highly porous structure. Thermal crosslinking of the aerogels has further stabilized their structure and flexibility without compromising on the porosity. Ease of processing, thermal stability, high porosity and oleophilic nature of these aerogels make them promising candidate for a wide variety of applications including acoustic and thermal insulation and oil and water separation. **Keywords :** hybrid aerogels, sol-gel electrospinning, oil-water separation, nanofibers

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