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Hybrid polymer/SWNT buckypapers

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Single-wall carbon nanotubes (SWNT) are well-known for their exceptional mechanical properties and are considered as one of the most promising reinforcing materials for next-generation high-performance composites. Buckypaper (BP) which is a freestanding sheet consisting of SWNT networks is an attractive materials since it possesses superb light weight, high thermal and electrical conductivity. In most recent work, researchers have tried to combine this particular SWNT structure with polymers to form BP-based polymer composites. Different methods have been used and can be divided into two categories: (i) infiltration of polymers into buckypaper and (ii) soaking buckypaper in polymer solution. Both processes require multiple steps to form the final composite film. In this work, a new route is used to prepare Hybrid Polymer/SWNT Buckypapers with specific morphologies using a simple one-step filtration method. SWNT are dispersed in polymer solutions, and these dispersions are filtered through membranes to obtain a freestanding composite film with high SWNT loading (~50wt%). Scanning electron microscope and wide-angle X-ray diffraction results provide details about the structure of these hybrid structures. Differential scanning calorimetry and tensile tests have also been utilized to study the thermal and mechanical properties of resultant films. The following results are presented in this poster.

Biography

Heng Li has been a Ph.D. student since Fall 2012 in Department of Mechanical and Industrial Engineering at Northeastern University. His research interests include understanding the interphase structure and morphology in nano-carbon based polymer composites and interfacial interactions within these systems. Currently, he is a graduate research assistant in Macromolecular Innovations in Nanomaterial Utilizing Systems (MINUS) Laboratory, under the advisory of Professor Marilyn Minus.

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