

عنوان مقاله:

Evaluation of Properties Carbon Nanotubes (CNTs) and CNT/Polymer Composites

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خلاصه مقاله:

The mechanical properties of carbon nanotubes, such as high elastic modulus and tensile strength, make them the most ideal and promising reinforcements in substantially enhancing the mechanical properties of resulting polymer/carbon nanotube composites. It is acknowledged that the mechanical properties of the composites are significantly influenced by interfacial interactions between nanotubes and polymer matrices. The current challenge of the application of nanotubes in the composites is hence to determine the mechanical properties of the interfacial region, which is critical for improving and manufacturing the nanocomposites. In this work, a new method for evaluating the elastic properties of the interfacial region is developed by examining the fracture behavior of carbon nanotube reinforced poly (methyl methacrylate) (PMMA) matrix composites under tension using molecular dynamics simulations. The effects of the aspect ratio of carbon nanotube reinforcements on the elastic properties, i.e. Young's modulus and yield strength, of the interfacial region and the nanotube/polymer composites are investigated. The feasibility of a three-phase micromechanical model in predicting the elastic properties of the nanocomposites is also developed based on the understanding of the interfacial region.

کلمات کلیدی:

Carbon Nanotubes, Mechanical Properties, Polymer, Composites, Elastic Properties

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