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Advances in the science and technology of carbon nanotubes and their composites: a review

Erik T Thostenson^a ... Tsu-Wei Chou^a

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Abstract

Since their first observation nearly a decade ago by Iijima (Iijima S. Helical microtubules of graphitic carbon *Nature*. 1991; 354:56–8), carbon nanotubes have been the focus of considerable research. Numerous investigators have since reported remarkable physical and mechanical properties for this new form of carbon. From unique electronic properties and a thermal conductivity higher than diamond to mechanical properties where the stiffness, strength and resilience exceeds any current material, carbon nanotubes offer tremendous opportunities for the development of fundamentally new material systems. In particular, the exceptional mechanical properties of carbon nanotubes, combined with their low density, offer scope for the development of nanotube-reinforced composite materials. The potential for nanocomposites reinforced with carbon tubes having extraordinary specific stiffness and strength represent

tremendous opportunity for application in the 21st century. This paper provides a concise review of recent advances in carbon nanotubes and their composites. We examine the research work reported in the literature on the structure and processing of carbon nanotubes, as well as characterization and property modeling of carbon nanotubes and their composites.



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