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Scalable Methods for the Use of Multi-walled Carbon Nanotubes in Polymer Composites

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Research interests include

- *Processing and characterization of polymer composites*
- *Bio-renewable polymers and composites*
- *Multifunctional materials*
- *Evaluation of materials using experimental mechanics and thermal analysis*

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Multi-walled carbon nanotubes (MWCNTs) have received considerable attention as reinforcement for composites because of their high tensile strength, stiffness, electrical and thermal conductivity, and low coefficient of thermal expansion. Despite the availability of huge quantities of low-cost, commercially synthesized nanotubes, the use of MWCNTs in engineering composites is extremely limited, owing to difficulties in achieving uniform dispersion and strong interfacial bonding with the matrix. A proven method of enhancing the nanotube-polymer interface and degree of MWCNT dispersion involves functionalizing the MWCNTs through oxidation with strong acids. While effective at laboratory scales, this technique is not well suited for large-scale operations because of long processing times, poor yield, safety hazards, and environmental concerns. In this presentation, Dr. Kessler discusses scalable solutions to several of the challenges associated with the fabrication of MWCNT-reinforced composites.

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