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**Multifunctional Polymer Nanocomposites.** ALEXANDRA MARIA GALASKA, HAIXIANG SONG, ZHANHU GUO, University of Tennessee — With more awareness of energy conversion/storage and saving, different strategies have been developed to utilize the sustainable and renewable energy. Introducing nanoscale fillers can make inert polymer matrix possess unique properties to satisfy certain functions. For example, alumina nanoparticles have strengthened the weak thermosetting polymers. A combined mixture of carbon nanofibers and magnetite nanoparticles have made the inert epoxy sensitive for magnetic field for sensing applications. Introducing silica nanoparticles into conductive polymers such as polyaniline has enhanced the giant magnetoresistance behaviors. The introduced nanoparticles have made the transparent polymer have the electromagnetic interference (EMI) shielding function while reduce the density significantly. With the desired miniaturization, the materials combining different functionalities have become importantly interesting. In this talk, methodologies to prepare nanocomposites and their effects on the produced nanocomposites will be discussed. A variety of advanced polymer nanocomposites will be introduced. Unique properties including mechanical, electrical, magnetoresistance etc. and the applications for environmental remediation, energy storage/saving, fire retardancy, electromagnetic interference shielding, and electronic devices will be presented.

Zhanhu Guo  
University of Tennessee

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