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Nanoparticles in Polymers: Assembly, Rheology and Properties

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Inorganic nanoparticles have the potential of providing functionalities that are difficult to realize using organic materials; and nanocomposites is an effective mean to impart processibility and construct bulk materials with breakthrough properties. The dispersion and assembly of nanoparticles are critical to both processibility and properties of the resulting product. In this talk, we will discuss several methods to control the hierarchical structure of nanoparticles in polymers and resulting rheological, mechanical and optical properties. In one example, polymer-particle interaction and secondary microstructure were designed to provide a low viscosity composition comprising exfoliated high aspect ratio clay nanoparticles; in another example, the microstructure control through templates was shown to enable unique thermal mechanical and optical properties.

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