Nanoparticle Effects on PVDF Crystallization and Morphology

Mansour AbdulBaki and Dr. Ramanan Krishnamoorti
Department of Chemical & Biomolecular Engineering
University of Houston
Houston, TX 77204-4004

Piezoelectric polymers are of great interest for advancing the field of smart and active materials systems. Piezoelectric polymers offer the benefits of low power requirements, high voltage sensitivity, fast electro-mechanical response, mechanical strength, and ease of processing. The right combination of material properties would garner the potential to greatly affect work in the fields of integrated smart structures that would not only provide lightweight mechanical reinforcement, but also shape control as well as embedded sensing and energy harvesting functionality.

Calorimetric as well as wide and small angle X-ray scattering (WAXS & SAXS) techniques are used to observe the effects of different nanoparticles on the crystallization of PVDF in order to understand the impact of such additions on the material's morphology as part of a larger effort moving toward truly active, reinforced, multi-functional, smart materials with intelligently tailored properties.