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Isothermal Crystallization of Poly(ethylene oxide) / Single Walled Carbon Nanotube Nanocomposites ARNALDO LORENZO, TIRTHA CHATTERJEE, RAMANAN KRISHNAMOORTI, University of Houston — The isothermal crystallization behavior of poly(ethylene oxide)/single walled carbon nanotubes (PEO/SWNT) nanocomposites were studied with a focus on the *overall crystallization kinetics* and the *morphological* evolution of PEO using differential scanning calorimetry and in-situ small angle x-ray scattering measurements, respectively. The overall crystallization process of the PEO was strongly affected by lithium dodecyl sulfate (LDS) stabilized carbon nanotubes. Further, analysis of the overall crystallization kinetics showed that the PEO chains were topologically constrained by the presence of LDS with an increased energy barrier associated with nucleation and crystal growth, and the nanotubes further act as a barrier to chain transport or enhance the LDS action on the PEO chains. The energy penalty and diffusional barrier to chain transport in the nanocomposites disrupt the PEO crystal helical conformation. This destabilization leads to formation of thinner crystal lamellae and suggests that the crystallization kinetics is primarily controlled by the growth process. This study is particularly interesting considering the suppression of the PEO crystallinity in presence of small amounts of Lithium ion based surfactant and carbon nanotubes.

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