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Semi-crystalline polymer nanocomposites: interplay of matrix crystallization and nanoparticle self-assembly DAN ZHAO, JACQUES JESTIN, LONGXI ZHAO, SANAT K. KUMAR, Columbia University, MOHAMMAD MOHAMMADKHANI, BRIAN C. BENICEWICZ, University of South Carolina — We investigate a new class of nanocomposite materials made of semi-crystalline poly(ethylene oxide) and poly(methyl methacrylate) grafted silica nanoparticles (NPs). The results indicate that NPs do not act as nucleating agents as indicated from the lowering of the onset of crystallization temperature with addition of NPs. Although the crystal sizes and rate of crystallization are reduced in the presence of NPs, the equilibrium melting temperature seems to be unaffected. Furthermore, no remarkable change was observed in the spatial dispersion of NPs upon fast crystallization. However, for slow crystallization, both TEM and X-ray scattering reveal that the system starts to be organized in a "layer-by-layer" architecture, where the NPs are aligned in the amorphous phases intercalated by the crystalline lamellar phases.

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