

Glassy-Crystalline Nanostructured Polymers Via Reactive Blending

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Summary: Nanostructured glassy-crystalline blends were obtained by reactive blending of poly(methyl methacrylate) (PMMA), or of poly(methyl methacrylate)-*b*-poly(*n*-butyl acrylate)-*b*-poly(methyl methacrylate) (MBM) triblock copolymer, with polyamide-6 (PA). The PMMA chain, or block, contains a low fraction of glutaric anhydride units which are strongly reactive toward the terminal amino group of PA. Under the blending conditions the grafting reaction is very efficient leading to a high fraction of graft copolymer. When the PA is short, $M_n = 2500$, nanostructured blends are obtained with both PMMA and MBM while for longer PA, $M_n = 15000$, nanostructures form only with the triblock MBM copolymer. The intrinsic property of MBM to self-organize in lamellar-like morphology seems to favour the nanostructure formation in the final blend. The resulting materials exhibit unique properties such as transparency, creep resistance and solvent resistance.

Keywords: nanostructure; PMMA; polyamide; reactive blending