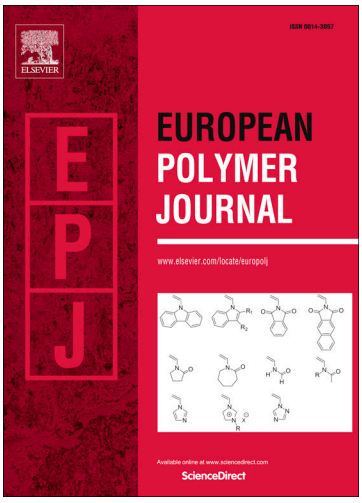

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Conventional and Rare-Patched Rod/Coil Matrix-Dispersed Patternings on Single Crystals Affected by Rigidity, Amorphism and Crystallinity of Brushes

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Abstract

Novel mixed-brushes subsuming rod-amorphous coil (polyaniline (PANI)-poly(styrene) (PS) or poly(methyl methacrylate) (PMMA)) and rod-crystallizable coil (PANI-poly(ε-caprolactone) (PCL) or poly(L-lactide) (PLLA)) were designed via growth of the single crystals of aforementioned materials block copolymers with poly(ethylene glycol) (PEG). In all rod-amorphous coil mixed-brushes, irrespective of the type of amorphous brushes (PS or PMMA), a matrix of amorphous coily brushes and disperses of conductive PANI nanorods were detected. Based on selected area electron diffraction (SAED) patterns obtained from the rod-crystallizable coil mixed-brushes, the presence of PANI nanorods induced a crystallinity to the crystallizable PCL and PLLA coily brushes, leading to the pseudorigid (crystalline brushes)-rigid (PANI nanorods) mixed-brushes. The rare-patched surface morphologies were acquired for both PANI-PCL and PANI-PLLA rod-coil brushes. Although the thicknesses and lateral sizes of PCL (2.3−4.6 nm and 13.9−14.4 nm) and PLLA (4.4−7.6 and 13.3−13.8 nm) patches were different, their growth prisms were similar, i.e., (110) and (200). The PANI nanorod diameters ranged in 6−10 for rod-amorphous systems, and were 6 and 7 nm in rod-crystalline ones. In addition to the osmotic pressure, the difficulty of arranging the crystallizable coily brushes in the crystalline structure of brushes could make further difficult the incorporation of their PEG blocks into the

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