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Structural Rearrangement of Miscible Polymer Blends at the Polymer/Substrate Interface XIGUO ZENG, SHAW L. HSU, University of Massachusetts Amherst, BRIGITTE WANG, CHARLES W. PAUL, National Starch & Chemical — Structural rearrangement of miscible polymer blends at the polymer/substrate interface has been investigated using Raman Micro-spectroscopy. In this study, blends of crystallizable poly (hexamethylene adipate) (PHMA) and acrylate random copolymer resin were observed on substrates of polycarbonate (PC), polypropylene (PP), and polymethyl methacrylate (PMMA). Results showed distinct selective migration and subsequent adsorption of polymer at the polymer/substrate interface. The final compositional distribution at the interface is determined by the type of substrate. Theoretical calculations based upon the Flory-Huggins theory were carried out relating the interaction parameter (χ) and miscibility of polymer blends and different substrates. The combined theoretical and experimental results clearly demonstrate that specific interactions at the interface are primary causes for structural rearrangement. Furthermore, the chain mobility and molecular weight of polymer blends were also found to be important factors affecting the migrations and consequent surface adsorption ratios.

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