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Spectroscopic Investigation on Morphology Development of Polymer Blends TOMOKO HASHIDA, YOUNG GYU JEONG, YING HUA, SHAW LING HSU, Polymer Science and Engineering Department, University of Massachusetts, Amherst, MA — For the first time, high spatial resolution ($\sim$1 μm^2) Raman micro-spectroscopy has been used to measure the composition and crystallite distribution of various crystallizable polymer blends. Crystallization kinetics and the degree of crystallinity were characterized using a combination of optical microscopy, thermal analysis, and time resolved FT-IR spectroscopy. These investigations were conducted for a number of binary blends incorporating crystallizable poly(hexamethylene adipate) (PHMA) or poly(hexamethylene sebacate) (PHMS) mixed with non-crystallizable poly(propylene glycol) (PPG). Although the two polyesters have similar chemical structure, they exhibit different phase behavior. Ternary blends including a high glass transition temperature (T_g) component were also studied. The local composition of polyester was found to control crystallization kinetics and degree of crystallinity. The compositional distribution in the polyester-rich phase was inhomogeneous. Surprisingly, the degree of crystallinity measured for polyesters did not necessarily correspond to the composition profile. The role of the third relative immobile component significantly changed both chemical and morphological distributions.

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