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Effects of Residual Crystallinity on the Crystallization Behavior of Random Polypropylene-Polyethylene Copolymer SAMUEL AMANUEL, Materials Science and Engineering, XIAOFENG CHEN, Chemical and Biological Engineering, RAHMI OZISIK, SANFORD S. STERNSTEIN, Materials Science and Engineering, Rensselaer Polytechnic Institute — Differential scanning calorimeter measurements revealed that blends of isotactic polypropylene and random polypropylene- polyethylene copolymer have two separate melting peaks, with a peak at 45 °C attributed to the copolymer and another peak at 160 °C attributed to the homopolymer. Annealing at temperatures below and above the melting of the homopolymer, 145 °C and 200 °C, resulted in changes of the melting temperature and melting enthalpy of the copolymer. This suggests that the crystallization behavior of the copolymer has been influenced by the residual crystallinity of the homopolymer. Furthermore, this crystalline memory has significant influence on the aging process of the blend. For instance, dynamic measurements, at room temperature, revealed that samples annealed at 120 °C have lower shear storage modulus compared to those that were annealed at 200 °C. Although physical aging increases the storage modulus in both cases, the rate at which it changes is also dependent on the presence of residual crystallinity.

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