

Abstract Submitted
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Overall Crystallization Kinetics of Polymorphic Poly (propylenes) YSELA CHIARI, KIMBERLY THOMPSON, RUFINA ALAMO, FAMU-FSU College of Engineering, Department of Chemical and Biomedical Engineering, Tallahassee, Fl — The isothermal crystallization of propylene ethylene random copolymers evolves with a simultaneous formation of two polymorphic forms, monoclinic crystals (alpha form) and orthorhombic crystals (gamma form). The relative content of each modification changes during crystallization. The content of gamma crystals developed at high levels of transformation increases with the concentration of ethylene and with the crystallization temperature. The overall crystallization kinetics of copolymers with an ethylene content ranging from 0.8 to 7.5 mol % were followed by DSC and analyzed according to classical Avrami kinetics. For most copolymers, fits with single stage nucleation and growth models were poor. Following structural models for lamellar growth that account for epitaxial gamma branching from alpha surfaces, the experimental data were modeled with parallel two-stage crystallization kinetics with excellent fits up to 80 % transformations. The Avrami exponents obtained from the fits are consistent with a 3-D spherulitic growth with instantaneous nucleation for alpha and homogeneous nucleation (linear with time) for the gamma phase.

Rufina Alamo
FAMU-FSU College of Engineering, Department of Chemical and
Biomedical Engineering, Tallahassee, Fl

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