

Abstract Submitted  
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**Real-Time FTIR Spectroscopic Study of the Crystallization Process of Random Isotactic Propylene-1-Alkene Copolymers** RUFINA G. ALAMO, JUAN P. FERNANDEZ-BLAZQUEZ, EDUARDO PEREIRA, CAROLINA RUIZ-ORTA, FAMU-FSU College of Engineering, Tallahassee, FL 32310 — The real-time evolution of IR regularity bands during isothermal crystallization of random propylene copolymers confirm the beginning of crystallization at a critical helical sequence length ( $n^*$ ) of about 12 isotactic units, corresponding to a vibrational frequency of 841  $\text{cm}^{-1}$ . The evolution with time of concentration of helical sequences below and above  $n^*$  allows to infer the details of helical organization at the early stages of crystallization. The concentration of helices of 10 isotactic units prior start of crystallization is at equilibrium. When spatial fluctuations of these helices allow the formation of a critical nucleus, growth to longer helices proceeds spontaneously, as indicated by identical kinetics of the 998 ( $n = 10$ ), 841 ( $n = 12$ ) and 1220 ( $n > 12$ )  $\text{cm}^{-1}$  bands. Furthermore, their final value correlates with the degree of crystallinity obtained by WAXD. All comonomer types hinder the formation of iPP helical sequences as observed by the strong decrease of concentration of helices  $< n^*$  with increasing comonomer content before crystallization is arrested. Comonomers that disrupt the TG conformational regularity, such as the ethylene unit, require a different IR-WAXD crystallinity calibration.

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