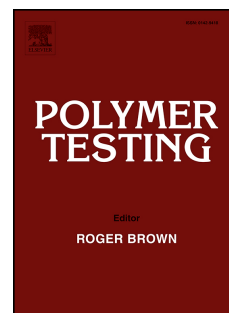


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Crystallization behavior and nucleation analysis of isotactic polypropylene with a multiamide nucleating agent

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ABSTRACT

The effect of one of the 1,3,5-benzenetrisamide derivatives, *N,N',N''*-tricyclohexyl-1,3,5-benzenetricarboxylamide (defined here as TMC), on the crystallization behavior of isotactic polypropylene (iPP) was investigated by differential scanning calorimetry. TMC shows excellent nucleating effect on iPP. The nucleation efficiency of the blends reaches 30% even at a very low loading of 0.05 wt% TMC. For 0.1 wt% TMC, the crystallization half-time of the blend decreases from 39.41 to 3.97 min at 136 °C, compared with pure iPP. The isothermal crystallization data were further analyzed by the Avrami model. The values of the Avrami exponent of the blends are comparable to that of pure iPP, indicating that the presence of TMC does not change the crystallization mechanism of the matrix. The presence of TMC increases significantly the nuclei density of iPP but has no discernible effect on its crystalline structure, evidenced by polarized optical microscopy and wide angle X-ray diffraction measurements.

Keywords: Isotactic polypropylene; Multiamide; Crystallization kinetics; Nucleation; Morphology

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