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Effect of Matrix Molecular Mass on the Crystallization of β -Form Isotactic Polypropylene Around an Oriented Polypropylene Fiber

JEROLD SCHULTZ, University of Delaware, XIAIOLI SUN, HUIHUI LI, XINQIN ZHANG, DUJIN WANG, Chinese Academy of Sciences, SHOUKE YAN, Beijing University of Chemical Technology — The role of molecular mass in an existing method for inducing the β -phase of isotactic polypropylene (iPP) has been investigated. The method consists of introducing oriented α -phase fibers into a molten iPP matrix, followed by crystallization of α - or β -form iPP in the matrix around the fiber at a lower temperature. Comparing the effects of iPPs of two different molecular masses, it is found that the lower molecular mass polymer is more efficient in inducing the β form. This result, coupled with results on the effects of fiber introduction temperature and crystallization temperature, leads to the hypothesis that the matrix chains are involved in the β -nucleation event and that partial relaxation of the surface of the oriented fiber is essential to the penetration of matrix chains into the oriented material prior to nucleation.

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