

Analysis of thermophysical and structural characteristics of organosilica nanocomposites

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Abstract. The work is devoted to theoretical and experimental studies of the dependence of the heat of crystallization of polymer nanocomposites on such factors as the mass fraction of the filler and the cooling rate of composites from the melt. The kinetics of non-isothermal crystallization of isotactic polypropylene (PP) and nanocomposites containing from 0.4 to 5.0 vol. % of air force. An analysis of crystal formation parameters was performed depending on the percentage of aerosol. A systematic increase in the crystallization barrier of lamellar crystallization of polypropylene in polymer nanocomposites is shown, which corresponds to a strong limitation of the transport of PP segments across the melt/lamella interface. The peculiarities of the influence of the structure of polymer nanocomposites on their thermophysical properties have been studied. It was established that the morphology of the PP lamellae remains unchanged depending on the cooling rate from the melt or the content of aerosols.

Keywords: polymer nanocomposite, crystallization parameters, crystallization mechanism.