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Non-isothermal melt crystallization behavior of Poly(ethylene terephthalate)/graphene nanocomposites SHIGERU AOYAMA, YONG TAE PARK, TOSHIAKI OUGIZAWA, CHRISTOPHER MACOSKO, Dept. Chemical Engineering & Materials Science, University of Minnesota — Poly(ethylene terephthalate)(PET)/graphene nanocomposites were prepared by melt mixing with a goal of reduced gas permeability. With 2 wt% of few layered graphene, PET/graphene composite films show more than 70% decrease in N_2 gas permeation. Their non-isothermal crystallization were also investigated by differential scanning calorimetory (DSC). Crystallization temperature, Tc, of PET/graphene nanocomposites was more than 8 °C higher than neat PET and the increment increased along with the concentration of graphene. This suggests that the nucleation effect of graphene enhanced with the increase in concentration of graphene. On the other hand, PET/graphene nanocomposites show shorter half crystallization time, $t_{1/2}$, than neat PET at lower concentrations, but $t_{1/2}$ increased along with concentration of graphene. From Raman spectroscopy, it was shown that PET chains in nanocomposites are strongly confined in the presence of an excess of graphene. Restricted mobility of PET chains slowed crystallization.

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