Structure and Characteristics of High Molecular Weight Poly(ethylene Terephthalate) Gel and Film

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High molecular weight poly(ethylene terephthalate)(PET) was prepared by using a modified postpolycondensation method. Gelation temperature(Tc^g) and gel melting temperature(Tm^g) of PET-nitrobenzene gel were measured, and gel forming process and non-isothermal crystallization behavior were investigated. Tc^g and Tm^g increased with increasing concentration of PET and decreased with increasing molecular weight of the polymer. The crystallization rate decreased with increasing the molecular weight and the concentration.

The high molecular weight PET in phenol/tetrachloroethane (6/4:w/w) was cast into film. Optimum critical concentration in the solvent casting was determined by viscosity measurement, and it was found that this concentration decreased with the molecular weight of the polymer. The solvent cast film had almost same modulus, but its tensile strength increased with the molecular weight of the polymer.