

Abstract

Poly (ethylene terephthalate) (PET) and poly (ethylene naphthalate) (PEN) are polymers whose thermal behavior has been successfully described by the three-phase model. The aim of this contribution is to study the effect of rubbery annealing on phase changes in the two materials by the use of this model. We were able through the study of crystallization kinetics to prove thermo-activated crystallization: PET crystallizes into a single system with an energy value of approximately 242.16 kJ/mole. However, PEN crystallizes in two regimes with two energy values equal to 102 and 234.6 kJ/mol. Calorimetric measurements have allowed us to study the isothermal crystallization of the two materials. This study led us to quantify the different phases present in the studied materials. A multiple melting phenomenon was highlighted when the crystallization reached its maximum rate. XRD measurements showed that PEN can crystallize into two forms of crystal lattice, namely the form α and the form β . However, PET crystallizes in a single form.