

Extension of Avrami Equation onto Nonisothermal Crystallization Kinetics of Poly(ethylene Terephthalate)

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The crystallization kinetics of polymers have been studied under isothermal conditions and also under nonisothermal conditions at constant cooling rates. Isothermal data are interpreted quite well in terms of Avrami equation[1]. On the contrary, nonisothermal data are analyzed by the equations of Ziabicki[2], Nakamura et al.[3], Ozawa [4], Harnisch and Muschik[5], Douillard et al.[6]. Among them, Ozawa, Harnisch and Muschik, and Douillard et al. modified the Avrami equation and applied to nonisothermal conditions. But it is difficult to connect and some discrepancies occur between isothermal and nonisothermal data.

Nonisothermal crystallization of poly(ethylene terephthalate) has been carried out by differential scanning calorimetry (DSC). All the data from DSC analysis were calculated by using modified Avrami equations which were proposed by Harnisch and Muschick, Ozawa, and Douillard et al. The parameters for nonisothermal crystallization process in the above equations were obtained and evaluated.

References

- 1) M. Avrami, *J. Chem. Phys.*, **7**, 1103 (1939); **8**, 212 (1940).
- 2) A. Ziabicki, *Appl. Polym. Symp.*, **6**, 1 (1967).
- 3) K. Nakamura, T. Watanabe, K. Takayama, and T. Amano, *J. Appl. Polym. Sci.*, **16**, 1077 (1972).
- 4) T. Ozawa, *Polymer*, **12**, 150 (1970).
- 5) K. Harnisch and H. Muschik, *Colloid & Polym. Sci.*, **262**, 908 (1983).
- 6) A. Douillard, Ph. Dumazet, B. Chabert, and J. Guillet, *Polymer*, **34**, 1702 (1993).