Time-Domain Spectroscopy Analysis of the Amorphous Phase in Semicrystalline Polycarbonate

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The amorphous state of bisphenol-A polycarbonate was examined by time-domain dielectric spectroscopy as a function of crystallization time over a frequency range of 0.1 mHz to 10 kHz. The dielectric measurements were performed in the temperature range around the glass transition temperature. Dielectric studies were performed on a series of samples, which were partially melted and recrystallized so as to investigate the influence of "secondary crystallinity" on the alpha relaxation, thereby probing the effect of crystalline constraints on cooperative motions in the amorphous fraction. Analysis of the relaxation behavior was performed by fitting the loss max frequency data to the Vogel-Fulcher-Hesse-Tammann and Arrhenius equations.