Simultaneous Measurement of Glass Transition Temperature and Crystallinity of Polymer Sheets and Films Using Ball Restitution

박진원, 한성수, 이재홍, 서명은, 최시영†
KAIST
(sqchoi@kaist.ac.kr†)

Glass transition temperature (T_g) and degree of crystallinity (X_c) are important properties of polymers. However, for some polymers, current techniques have difficulties in measuring T_g and X_c, particularly for as-prepared films without damage. Here, we develop a new technique to simultaneously determine T_g and X_c by measuring the restitution of a ball on an intact polymer film or a sheet as a function of temperature. Demonstrating with six different types of polymers, we show that T_g is the onset of the decrease in restitution and X_c is the minimum restitution. Our simple yet versatile technique could provide a useful tool to measure challenging T_g and X_c of films and sheets by the conventional methods (DSC, WAXS).