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PAPER I-VI

Fig. 1. Temperature dependence of volume and enthalpy during cooling of polymer in glass transition region [1].

This figure shows the volume and enthalpy dependence on the temperature at a constant pressure during the sample cooling in the glass transition region. The glass transition temperature, T_g , is defined as the intersection of the equilibrium liquid line and the equilibrium glassy line. Above T_g a polymer is in an equilibrium state. Then, during cooling, the polymer passes through the glass transition region and becomes heat brittle amorphous solid. In the glassy state, molecular mobility sharply falls down to the freezing point, T_f , marked by the crystallization temperature, the value of which is usually about 1.5 times higher than that of T_g [1,3]. Two different cooling rates, q_1 and q_2 , result in two different glass transition temperatures, $T_g(T_{q1})$ and $T_g(q_2)$, and thus in two different final values of α and β , respectively. Isothermal annealing of glass is followed by a restoration in both volume and enthalpy of