

Crystallization kinetics and Creep resistance of polyethylene methacrylate ionomers with different sodium ion contents

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This study focuses on the commercial ionomer Surlyn resin. By acidifying the resin and partially re-neutralizing it with NaOH_{aq} to varying degrees, a series of model samples with defined degrees of neutralization were prepared. On one hand, rheological measurements and fast scanning calorimetry (flash DSC) were employed to investigate the dissociation kinetics and crystallization behavior of the samples, aiming to uncover the intrinsic relationship between reversible crosslinking and crystallization kinetics in semicrystalline polymers. On the other hand, tensile creep tests were conducted at different temperatures to assess the influence of ionic associations on macroscopic creep behavior. The results show that, beyond a certain degree of association, the anchoring effect suppresses crystallization rate and alters lamellar thickness distribution. Since both crosslinking and crystallinity inhibit creep, their trade-off leads to optimal creep resistance at a specific degree of association.