

## ABSTRACT

Ionomers having both carboxylate and sulfonate groups in the same polymer backbone were obtained by sulfonation of maleated EPDM rubber and maleated SEBS block copolymer, followed by its neutralization with different metal acetates. Infrared spectroscopic studies confirm the formation of both carboxylate and sulfonate salts in the ionomers. Ionic groups act as thermolabile physical crosslinks and causes dramatic improvement in physical properties. Dynamic mechanical thermal analysis shows the presence of a high temperature rubbery plateau in the case of the ionomers. Dielectric studies show that incorporation of ionic groups prevents increase in dielectric constant at elevated temperature. Zinc stearate acts as a plasticizer above its melting point ( $>128^{\circ}\text{C}$ ) and imparts some degree of reinforcement at ambient temperature onto the ionic elastomer based on sulfonated maleated EPDM rubber. Incorporation of fillers like carbon blacks and precipitated silica causes improvement in physical properties of the ionomer based on sulfonated maleated EPDM. While studying the effects of degree of neutralization on the properties of ionomer based on sulfonated maleated SEBS, it was found that the low degrees of neutralization (25% and 50%) do not affect the polymer properties significantly, while higher degrees of neutralization ( $>75\%$ ) causes dramatic changes in the properties. Both small angle X-ray scattering and transmission electron microscopic studies indicate the changes in morphology on ionomer formation. The studies reveal occurrence of heterogeneous morphological structure in the ionomers. Reprocessability studies show that the ionomers can be recycled like thermoplastic elastomers.

**Key Words :** sulfonated maleated EPDM rubber; sulfonated maleated SEBS block copolymer; ionomers; plasticization; dynamic mechanical thermal analysis; dielectric thermal analysis; small angle X-ray scattering; SEM fractography; transmission electron microscopy; processability; physical properties; reprocessability.