

Magnetic (Ethylene-Octene) Polymer Composites Reinforced With Carbon Black

Authors : Marcin Maslowski, Marian Zaborski

Abstract : The aim of the study was to receive magnetorheological elastomer composites (MRE) with the best mechanical characteristics. MRE based on different magnetoactive fillers in ethylene-octene rubber are reported and studied. To improve mechanical properties of polymer mixtures, also carbon black (N550) was added during the composites preparation process. Micro and nan-sized magnetites (Fe_3O_4), as well as gamma iron oxide ($\gamma\text{-Fe}_2\text{O}_3$) and carbonyl iron powder (CIP) are added together with carbon black (N550) were found to be an active fillers systems improving both static and dynamic mechanical properties of elastomers. They also changed magnetic properties of composites. Dynamic-mechanical analysis (DMA) indicates the presence of strongly developed secondary structure in vulcanizates. Reinforcing character of applied different fillers systems results in an increased stress at 100% elongation, tensile strength and cross-linking density of the vulcanizates. Studies investigated by vibration sample magnetometer (VSM) proved that all composites exhibit good magnetic properties.

Keywords : carbon black, mechanical properties, magnetorheological composites, magnetic fillers

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