

Magnetorheological Elastomer Composites Obtained by Extrusion

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Abstract : Magnetorheological elastomer composites based on micro- and nano-sized magnetite, gamma iron oxide and carbonyl iron powder in ethylene-octene rubber are reported and studied. The method of preparation process influenced the specific properties of MREs (isotropy/anisotropy). The use of extrusion method instead of traditional preparation processes (two-roll mill, mixer) of composites is presented. Micro and nan-sized magnetites as well as gamma iron oxide and carbonyl iron powder were found to be an active fillers improving the mechanical properties of elastomers. They also changed magnetic properties of composites. Application of extrusion process also influenced the mechanical properties of composites and the dispersion of magnetic fillers. Dynamic-mechanical analysis (DMA) indicates the presence of strongly developed secondary structure in vulcanizates. Scanning electron microscopy images (SEM) show that the dispersion improvement had significant effect on the composites properties. Studies investigated by vibration sample magnetometer (VSM) proved that all composites exhibit good magnetic properties.

Keywords : extrusion, magnetic fillers, magnetorheological elastomers, mechanical properties

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