Abstract Submitted
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Nanowire-Based Magnetorheological Elastomers[1] RICHARD C. BELL, JACOB L. PLANINSEK, JOSEPH A. FILER II, Dept. of Chemistry, Pennsylvania State University, Altoona College, Altoona, PA 16601 USA, HYUN J. SONG, NORMAN M. WERELEY, Dept. of Aerospace Engineering, University of Maryland, College Park, MD 20742 USA — Magnetorheological elastomers (MREs) are composite materials consisting of ferromagnetic particles aligned within an elastomer matrix. The stiffness of the elastomer can be controlled by varying the magnitude of an applied magnetic field. In this study, we present the static and dynamic characteristics of nanowire-based MREs and compare their response to those containing conventional particles. The MRE samples were fabricated using various ferromagnetic materials (iron, cobalt, and nickel) and particle loadings in a silicone rubber matrix and their characteristics evaluated using a material test machine. The static and dynamic properties of the MREs were evaluated under a compressive load for the various compositions. The equivalent damping coefficient of the MRE samples was measured and compared under various magnetic field intensities. The dynamic characteristics, including the dynamic stiffness and loss factor, were measured under sinusoidal excitation in the frequency domain.

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