# Tunable Wetting and Adhesion Properties of Magnetorheological Elastomer Films

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We fabricated magnetorheological elastomer (MRE) films consisting of polydimethylsiloxane and various concentrations of fluorinated carbonyl iron particles. The application of a magnetic field to the MRE film induced changes in the surface morphology due to the alignment of the iron particles along the magnetic field lines. At low concentrations of iron particles and low magnetic field intensities, needle-like microstructures predominated. These structures formed more mountain-like microstructures as the concentration of iron particles or the magnetic field intensity increased. The surface roughness increased the water contact angle from 100° to 160° and decreased the sliding angle from 180° to 10°. The wettability and adhesion properties changed substantially within a few seconds simply upon application of a magnetic field. Cyclical measurements revealed that the transition was completely reversible.