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Effects of AC Electrical Field on the Dielectrophoresis Force of Dielectric Elastomers and Blends ANUVAT SIRIVAT, RUKSAPONG KUNANURUKSAPONG, The Petroleum and Petrochemical College, Chulalongkorn University — The effects of frequency and amplitude of AC electric field on the deflection and the dielectrophoresis force of an acrylic elastomer (AR71), styrene copolymers (SAR and SBR), and the blends of doped PPP and AR71 are investigated. The dielectrophoresis forces of the dielectric elastomers and blends were measured by using a vertical cantilever fixture at various frequencies (0.3 to 60 Hz) and at AC electric field strengths of 200-800 V_{pp}/mm . The effects of the thicknesses of the specimens and the particle concentration are studied. The doped PPP particles are embedded in the AR71 with concentrations of 1, 10, and 20 %vol. The dielectrophoresis forces and deflection distance of the dielectric elastomers and blends generally increase with increasing amplitude but slightly decrease with increasing frequency; and they dramatically drop at the cut-off frequency. The cut-off frequencies are 7.84, 1.45, and 0.74 Hz for AR71, SAR, and SBR, respectively, at E of 800 V_{pp}/mm and a thickness of 0.7 to 0.8 mm. After blending the AR71 with doped PPP, the cut-off frequencies of the 1 %vol, 10 %vol and 20 %vol of doped PPP are 18.51, 15.28, and 10.67 Hz, respectively, at an E of 800 V_{pp}/mm and a thickness of 0.2 to 0.3 mm. The conductive polymer particles are shown here to improve the electromechanical responses at high frequency.

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