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Smart lens made of dielectric elastomer: simulation study HONG TANG, Temple University — Electroactive Polymers (EAPs) are polymers that exhibit a change in size or shape when stimulated by an electric field. The common applications of this type of material are in actuators and sensors. A typical characteristic property of an EAP is that they will undergo a large amount of deformation while sustaining large forces. It has been demonstrated that EAPs can exhibit a strain from 10% to 300%. A dielectric elastomer (DEA) is a compliant capacitor, where a passive elastomer film is sandwiched between two compliant electrodes. When a voltage is applied, the electrostatic pressure arising from the Coulomb forces acting between the electrodes, therefore the electrodes squeeze the elastomer film. Based on the finite element analysis, we simulated the deformation of a polymer lens made of transparent dielectric elastomer materials under an application of electric field, which is provided by the transparent thin metal layers coated on the upper and lower surfaces of the lens. The focus of the lens can be adjusted by the applied electric field strength. By designing the electrode configuration on the lens surfaces, one can achieve both the positive and negative adjustment for the focus length.

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