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Electrophoresis of deformable elastic particles TONG GAO, T.N. SWAMINATHAN, HOWARD HU, University of Pennsylvania — Electrophoretic motion of a deformable dielectric elastic particle, having a fixed zeta potential,placed in an external electric field, has been numerically simulated. The potential field is solved in the fluid external to the particle, to compute the applicable Helmholtz-Smoluchowski slip boundary conditions on the particle surface. A constitutive equation is constructed for an incompressible neo-Hookean elastic solid where the extra stress tensor is assumed to be linearly proportional to the *Almansi* strain tensor, to govern the deformation of the particle. A monolithic finite element solver which uses an Arbitrary Lagrangian-Eulerian moving mesh technique is then used to solve the velocity, pressure and stress field in both the fluid and solid phases simultaneously. The particle is initially elliptical and is aligned perpendicular to the direction of the applied electric field. Elastic deformation is observed as the particle moves. Two cases of zero and finite Reynolds number are examined to delineate the effect of the inertial terms on the deformation of the particle. The stress and pressure distributions on the particle surface are also compared with some analytical solutions.

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