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Electrophoretic mobility of deformable elastic particles in confined geometries TONG GAO, HOWARD HU, University of Pennsylvania — Electrophoretic motion of a dielectric neo-Hookean elastic particle in a confined microchannel is simulated by an Arbitrary Lagrangian-Eulerian moving mesh technique. The particle with a fixed zeta potential is initially elliptical and aligned perpendicular to the direction of the applied electric field. The size of the electrical double layer is assumed to be negligible compared with the particle size and the classical Helmholtz-Smoluchowski slip boundary conditions are applied on the particle surface. When the Reynolds number is low, the elastic deformation is purely induced by the viscous shear force distribution along the body. In the unbounded domain, it is known that the particle will move with a constant Helmholtz-Smoluchowski velocity which is independent of the particle deformation. However, in the confined channel, the rigid walls not only alter the particle-electrical field interaction but also tend to slow the particle motion. To explore the wall effect on the electrophoretic mobility of the particle, the migration velocity is examined by systematically changing both the channel size and the material properties. Also the particle motion in non- Newtonian fluids are simulated and compared with Newtonian cases.

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