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Effect of Induced Charge Electroosmosis on the Dielectrophoretic Motion of Particles T. SWAMINATHAN, HOWARD HU, University of Pennsylvania — Most suspensions involve the formation of ionic double layers next to the surface of particles due to the induced-charge on the surface. These double layers affect the motion of the particle even under AC electric fields. They modify the net dipole moment of the particle and at the same time produce slip velocities on the surfaces of these particles. A method to numerically evaluate the effect of the double layer on the dielectrophoretic motion of particles has been previously developed to study these two effects. The technique involves a matched asymptotic expansion of the electric field near the particle surface, where the double layer is formed, and is written as a jump-boundary-condition for the electric potential when the thickness of the double layer is small compared to the size of the particle. The developed jump-boundary-condition is then used to calculate an effective zeta potential on the particle surface. Unlike classical electroosmosis, this zeta potential is no longer constant on every part of the surface and is dependent on the applied electric field. The effect of the induced-charge electroosmotic slip velocity on the dielectrophoretic motion of particles has been observed using this technique.

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