265e Measuring Charge Nonuniformity on Colloidal Particles

Darrell Velegol and Joseph F. Jones

Classical models for colloidal forces assume that the particles are uniformly-charged. However, charge nonuniformity can decrease suspension stability and reduce the accuracy of colloidal assemblies. We introduce a rapid method for measuring charge nonuniformity on particles, called "charge nonuniformity light scattering" (CNLS). CNLS takes advantage of two effects: 1) nonuniformly-charged particles will rotate in an applied electric field (rotational electrophoresis), and 2) light scattering from anisotropic particles changes when the particles align. CNLS combines the physics of rotational electrophoresis, "visualization" by light scattering, and interpretation by electrokinetics to measure charge nonuniformity on particles. In this talk we verify the method using a model system, and then use the method to examine charge nonuniformity on particles and bacteria.