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Patterning of non-spherical particles onto electrode surface: Study of orientation behavior under viscous fluid and AC electrokinetic forces RAVIRAJ THAKUR, Purdue University, STUART WILLIAMS, ROBERT COHN, JEREMY RATHFON, University of Louisville, JEAN-FRANÇOIS BERRET, MINHAO YAN, Université Denis Diderot-Paris, STEVEN WERELEY, Purdue — Recently we had proposed a technique called rapid electrokinetic patterning(REP), a tool that can manipulate colloidal particles near illuminated spot on an electrode surface. REP utilizes optical landscapes to create gradients in temperature allowing local changes in permittivity and conductivity of the fluid creating a microvortex. However, REP has been demonstrated till now only with spherical particles. We expand upon the initial disclosure of REP and conduct experiments with non-spherical beads. In the presence of linearly polarized field a non-spherical particle experiences frequency dependent alignment torques along three principle axis. This is mainly because of the different polarizability along each direction. In a fluid flow, a non-spherical particle would align itself in order to minimize the viscous drag. But characterizing the orientation behavior of non-spherical particles under the influence of both electric field and viscous fluid drag presents a unique physics problem. We observed the vertical orientation of the cylinders in the REP aggregation. We explore the mobility of the captured particles on the surface with respect to various physical parameters.

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