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Transport of charged colloidal particles in a nonpolar solvent in response to an electric field TINA LIN, THOMAS KODGER, DAVID WEITZ, Harvard University — In nonpolar solvents, particle charging is often controlled through the addition of suitable surfactants, which form charge-stabilizing reverse micelles. By combining microfluidics and confocal microscopy, we directly visualize the dynamics of charged colloidal particles in a nonpolar solvent with reverse micelles in response to an external electric field; this enables us to probe the internal electric field as well as the charging properties of the particle solution. We discover some surprising particle behavior: despite a constant applied electric field, particle transport through the fluid is nonlinear and the apparent particle mobility decays in time; subsequently, the charged particles appear to diffuse freely within the bulk solution. We characterize this behavior and find that the charged reverse micelles play a significant role.

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