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Field-directed assembly of colloidal ellipsoids[1] PETER J. BELTRAMO, ERIC M. FURST, University of Delaware — Self-assembly of colloidal building blocks into ordered structures has become a rapidly evolving area of research due to the novel properties (thermal transport, photonic, electromagnetic) imparted by periodicity.[2] Assembly of anisotropic particles presents numerous challenges, namely kinetic arrest at high particle volume fractions due to glassy dynamics. This prevents the realization of theoretically predicted close-packed phases.[3] In this work, we use AC electric fields to align dilute polystyrene ellipsoidal particles in suspension and a drying front to concentrate the particles into orientationally ordered thin films. Results using several aspect ratio particles are presented. The dilute electrokinetic properties which enable this field-directed assembly are characterized by dielectric spectroscopy and electrophoretic mobility measurements. Light scattering is used to evaluate the frequency and field strength dependence of particle alignment. Finally, the nanomechanical and phononic properties of the films are evaluated by Brillouin light scattering.

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[2]M. Grzelczak et al. ACS Nano, **4**, 3591 (2010)
[3]A. Donev et al. Phys. Rev. Let., **92**, 255506 (2004); P. Pfleiderer et al. Phys. Rev. E, **75** 020402 (2007)

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