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Behavior of anisotropic particles at air/nematic interface IRIS B. LIU, MOHAMED A. GHARBI, Department of Chemical and Biomolecular Engineering, University of Pennsylvania, RANDALL D. KAMIEN, Department of Physics and Astronomy, University of Pennsylvania, SHU YANG, Department of Materials Science and Engineering, University of Pennsylvania, KATHLEEN J. STEBE, Department of Chemical and Biomolecular Engineering, University of Pennsylvania — Colloidal particles with non-spherical shapes or deliberate patchiness can create capillary interactions that direct assembly in well-defined orientations. These effects have been considered only recently at simple fluid interfaces, and are largely unexplored at complex fluid interfaces. Anisotropic particles immersed in liquid crystals can also generate strong directed interactions. In this work, we explore the influence of particle geometry in colloidal interactions at nematic interfaces. We use particles of cylindrical shape, with controlled surface chemistry (anchoring and wetting properties) and report their behavior at an air/nematic interface. We study the interactions and self-assembly of these particles as a function of their aspect ratios. When cylinders are captured at the nematic interface, they induce deformation of the interface to satisfy wetting properties at particle surface. In addition, their presence induces distortion of the uniform director filed at the air/nematic interface to satisfy anchoring properties. Elastic and capillary interactions compete with each other and the resulting potential drives assembly of particles into novel structures. Recent progress in understanding colloidal interaction of anisotropic particles is presented.

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