

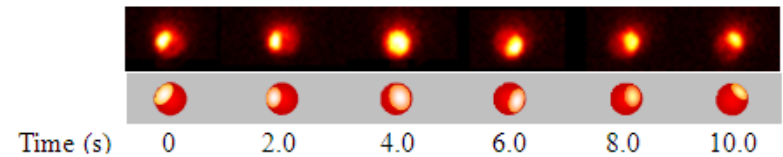
Colloids Painted Black and White: Rotational Diffusion of MOON particles

Steve Granick, Dept. of Materials Science and Engineering, University of Illinois

Petroleum relevance and novelty: Colloidal particles whose chemical composition differs on two hemispheres can be produced inexpensively, and efficiently by the method developed in this project, which consists of chemical modification of particles locked into stable position of an oil-water emulsion at a temperature where the oil turns waxy. Potential applicability is envisaged in novel polymer nanocomposites.

We developed molecular colloids that self-assemble by orientation-dependent interaction analogous to chemical and physical bonds. Progress during this 2-year PRF-AC grant concerned:

- new single-particle tracking algorithms to quantify rotational diffusion while removing diffraction broadening.*
- quantification of structures formed by bipolar particles, in cooperation with Monte Carlo simulations by Prof. Erik Lijten.*
- versatile synthetic methods to produce Janus particles efficiently and in high yield.*



Top: SEM micrograph of particles adsorbed on wax. Bottom: fluorescence images demonstrating Janus geometry.