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"Patchy" Particles

By

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Surface modified particles, so-called patchy particles, have been recognized as important building blocks in the directed assembly of particles into desired target structures.¹ Various methods employing shadow evaporation and templating have been used to create spherical particles with reactive anchor patches of controllable size and position. Subsequently, patchy particles can be directed to assemble into interesting structures using electrical and magnetic fields or can be linked chemically via molecular modification of the patches.

We will report on the use of the "Glancing angle vapor deposition" technique developed in our group² combined with stamping for the fabrication of patchy particles with two orthogonal patches. The tilting and rotation of a colloidal monolayer with respect to the evaporation source allows the controlled deposition of patches as small as 4% of the overall particle surface. The stamping enables access to the opposite side of the particles and the deposition of a second patch. A simple geometrical model is used to predict the patch geometry and relative orientation of the patches. Preliminary data on the field directed assembly of these particles and their behavior in oxidative environments will also be reported.

(1) Glotzer, S. C.; Solomon, M. J. "Anisotropy of Building Blocks and Their Assembly into Complex Structures" *Nature Mater.* **2007**, *6*, 557-562.

(2) Pawar, A. B.; Kretzschmar, I. "Patchy Particles by Glancing Angle Deposition" *Langmuir* **2008**, *24*, 355-358.

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