

Patchy depletion interactions

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The investigation of the entropic forces among anisotropic particles has shown that the shape of the particle can induce directionality in the depletion interaction [1]. We show how simple Asakura-Oosawa-like [2] geometrical arguments predict also a strong dependence of the depletion interaction on the local curvature of the particles. We investigate via Monte-Carlo methods the depletion interaction among a simple model of non-spherical hard particles showing how the local curvature can induce directionality in the depletion interaction. The patchy character of the resulting effective potential is a useful building brick to induce (self-)assembly [3]. Since the depletion potential depends on size and shape, and not on the chemical composition, shape-engineering of reversible depletion interactions can be applied to any particle suspension, i.e., metallic, semiconductor, or oxide [4]. We therefore believe that the ability to quantitatively predict and reversibly tune the strength and the directionality of the interaction potential by solvent composition and temperature is a simple and powerful tool to control particles' assembly.

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