

Synthesis of cubic colloids for as model well-defined depletion interactions

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Recently it was shown that micrometre sized colloidal superballs (rounded cubes) form dense colloidal crystals by adding non-adsorbing polymers[1,2]. These polymers act as a depletant, creating an attraction between individual colloids. It was found that the properties of these crystals are dependent on the particles shape (cube-ness) and the colloid-depletant size ratio. The range of this experimental system, however, is limited by the inherent rounded edges of the superballs. Therefore, we extend on the previous work to further investigate the behaviour and assembly with more cubic colloids. Cuprous oxide (Cu₂O) nanocubes with sharp edges were synthesized [3] and used as a sacrificial template to obtain hollow silica cubes with edge lengths of approximately 100 nm. These well-defined silica cubes are excellent model systems to study the phase behaviour of colloidal cubes with and without depletants. Additionally, the dimensions of the smaller silica cubes allow for other analytical techniques, such as light scattering and ellipsometry.

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