

Colloidal self-assembly of triblock Janus particles and other patchy colloids

F. Sciortino

Università di Roma "La Sapienza", Dipartimento di Fisica
Piazzale A. Moro 2 , I-00185 Roma, Italy

Colloidal particles have the right size to form ordered structures with periodicities comparable to the wavelength of visible light. Driven by the demands of several emergent technologies, efforts have been made to develop efficient, self-assembly-based methodologies for generating colloidal single crystals with well defined morphologies. Somewhat unfortunately, these efforts are often frustrated by the formation of structures lacking long range order; hard-sphere colloids, for example, crystallize into coexisting regions of face-centered cubic and hexagonal closed-packed structures. Inspired by recent developments in the synthesis and understanding of patchy colloids, we show that the rational design of patch shape and symmetry can drive the system to crystallize in a single, selected morphology by structurally eliminating undesired polymorphs.

References

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