

Fabrication and structural analysis of binary colloidal crystals with two-dimensional superlattices

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The assembly of submicrometer-sized colloidal particles into ordered two- and three-dimensional structures called colloidal crystals has been intensively studied over the past decade because of their potential applications. Herein, we present a new method for the fabrication of binary colloidal crystals and show obtained new types of binary colloidal crystals with two-dimensional superlattices. Recently, we have developed a new procedure called successive contact line movement, which can produce well-ordered 2-D colloidal crystals with colloidal particles of various sizes over a large area. We used this new method for constructing binary colloidal crystal. We fabricated the mono-layered colloidal crystals of large colloidal particles using successive contact line movement, which was used as the template. We then used the same process to deposit small colloidal particles on the template. By properly adjusting the ratio of the diameters of the small and large spheres, and the concentration of small spheres, we can fabricate binary colloidal crystals with various structures.