

Abstract Submitted
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Large-area nanocrystal superlattice films by surface-tension mediated self-assembly. ANGANG DONG, CHRISTOPHER MURRAY, University of Pennsylvania — We report a facile and general approach based on the dynamic self-assembly of nanocrystals on the liquid/liquid interface to fabricate hierarchically ordered nanocrystal superlattice films with areas up to several square centimeters. In addition to the close-packed ordering of nanocrystals at nanometer scale, the film exhibits exceptionally ordered stripe patterns at micrometer scale. The stripes are formed by the controlled, repetitive stick-slip motion of the liquid-liquid contact line. Both the film thickness and the stripe periodicity are tunable by changing the nanocrystal concentration. The final nanocrystal film, supported on the liquid surface, can be readily transferred to arbitrary substrates for device fabrication. The methodology reported here not only provides a simple and highly reproducible approach for production of large-area nanocrystal superlattice films, but also opens up a new avenue for lithography-free patterning of nanocrystal arrays for applications in optical, electronic, and magnetic devices.

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