

Abstract Submitted  
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**Capturing the Crystalline Phase of Two-dimensional Nanocrystal Superlattices in Action**<sup>1</sup> ZHANG JIANG, X-ray Science Division, Argonne National Laboratory, XIAO-MIN LIN, Center for Nanoscale Materials, Argonne National Lab, MICHAEL SPRUNG, SURESH NARAYANAN, JIN WANG, X-ray Science Division, Argonne National Laboratory — Critical photonic, electronic, and magnetic applications of two-dimensional nanocrystal superlattices often require nanostructures in perfect single-crystal phases with long-range order and limited defects. Here we discovered a crystalline phase with quasi-long-range positional order for the two-dimensional nanocrystal superlattice domains self-assembled at the liquid-air interface during droplet evaporation, using in situ time-resolved x-ray scattering along with rigorous two-dimensional crystal theories. It was observed that drying these superlattice domains resulted in only orientational order but not long-range positional order, also supported by quantitative analysis of transmission electron microscopy images.

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