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Kinetic growth of binary colloidal crystals in monolayer AN PHAM, Duke Univ, RYOHEI SETO, ELIOT FRIED, Mathematical Soft Matter Unit, Okinawa Institute of Science and Technology Graduate University, BENJAMIN B. YELLEN, Duke Univ — A two-dimensional binary mixture of colloidal particles is a convenient experimental model for probing the dynamics of phase transitions in alloys. Here, we report a combined experimental and numerical study on the crystallization kinetics of binary colloidal particles suspended in a quasi-two-dimensional fluid film. To assess the size of the crystals, we use bond-order parameters and cluster aggregation algorithms to determine the mean domain sizes of crystals formed in different annealing conditions. Our study indicates that particle defects are the main source of frustration, limiting the growth of large crystals. We have grown crystals with almost 1500 particles in experiments; however simulations suggest that crystals having more than 10000 particles can be formed in a system free of particle defects. The average size and kinetic growth of domains are in agreement between experiments and simulations, when particle defects are included in simulation as the same concentration found in experiments.

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