Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Template-Guided Langmuir-Blodgett Deposition of Colloidal Particles JAEHYUN HUR, YOU-YEON WON, Purdue University — We present a new method of fabricating highly-ordered two-dimensional (2D) colloid crystals with non-closed-packed symmetries. In this method, using the Langmuir-Blodgett (LB) monolayer deposition technique, we transfer a Langmuir monolayer of colloidal particles constructed at the air-water interface onto a substrate which contains micro-fabricated topological patterns. We demonstrate that by using this template-guided LB deposition method, a perfect single 2D colloid crystal structure that is homogeneous throughout the entire area of the patterned substrate can be economically fabricated under appropriate LB processing conditions. We investigate the effects of various control parameters (such as the initial particle density at the air-water interface, the substrate lifting speed, and the humidity condition during the LB monolayer deposition) on the structural properties of the resultant LB colloid monolayer. As the compression area or the lifting speed is increased, the average density of the deposited particles in the resultant LB colloid monolayer becomes reduced. The evaporation of water causes an undulation in the deposited particle density profile along the substrate lifting direction. We present a theoretical model which can quantitatively explain all these experimental observations.

You-Yeon Won
Purdue University

Date submitted: 27 Nov 2007 Electronic form version 1.4