Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Fabrication of polymer-bridged monolayer of colloidal crystal at water surface CHI-CHIH HO, KENG-HUI LIN, WEN-TAU JUAN, WEI-LI LEE, INSTITUTE OF PHYSICS, ACADEMIA SINICA TEAM — We have developed a new method to prepare a 2D colloidal crystal at the water/air interace, transferred the crystal onto a substrate, and stabilized the crystal structure of domain size 200x200 μm^2 by polymer bridging effect. We analyzed the interparticle spacing from the diffraction patterns and found that even at very high area fraction there was tiny separation between particles at water/air interface due to Coulomb repulsive force and Brownian fluctuation. After adding polyethylene oxide (PEO) into the solution, the interparticle separation is further reduced. PEO is known to adsorbed onto particle surface and provide bridging between particles. During transferring the particles onto a substrate, this adsorbed polymer layer provides a repulsive barrier to prevent the pulling from the capillary force which causes cracks in the original crystal structure. The resulting large domain of single 2D crystals can be used as a mask for fabricating periodic nanostructures.

Chi-Chih Ho

Date submitted: 09 Nov 2009 Electronic form version 1.4