

### Fabrication of photonic crystal film with silica@PMMA particles

이준석, 임채호, 양승만\*  
KAIST  
(smyang@kaist.ac.kr\*)

A demand of hybrid materials such as core-shell or anisotropic particles is steadily increasing because they have diverse properties toward multifunctional applications including drug delivery system, colloidal lithography, holographic lithography, photonic crystals and so on. Here, we synthesized mono-dispersed silica@PMMA particles and fabricated photonic crystal film with these particles. First, we used two phase method, which employs L-arginine amino acids as a hydrolysis catalyst because it's very difficult to synthesize silica particles of size less than 200 nm through conventional Stöber method. Next, the 190 nm silica particles were treated with 3-trimethoxysilyl propyl methacrylate (MPS) in order to modify the surface of particles with double bond and methyl methacrylate (MMA) monomers were polymerized on silica particles. The MMA shell thickness of silica@PMMA particles could be controlled from 5 nm to 20 nm by varying the amount of MMA monomer. Also, we could change the photonic bandgap of the photonic crystal with silica@PMMA particles by changing the shell thickness of particles.