

## Fabrication of Colloidal Crystal Films with Functionalized Polystyrene for Bio-applications

최재훈<sup>1,2</sup>, 이승곤<sup>1,2</sup>, 이수연<sup>1,2</sup>, 서영빈<sup>2</sup>, 양승만<sup>1,2,\*</sup>

<sup>1</sup>한국과학기술원 광자유체집적소자연구단;

<sup>2</sup>한국과학기술원 생명화학공학과

(smyang@kaist.ac.kr\*)

Colloidal crystal films have been studied by several research groups due to their applications as photonic crystals, sensors, and matrices for catalysts. Especially, demand for them in bio-applications is increasing because of cheap manufacturing cost and fast detection with naked eye. These applications need colloidal crystal films with defect-free and well-ordered over the large area but they can be hardly achieved by common self-assembly method.

In this experiment, we fabricated colloidal crystal films by dip coating method and controlled the thickness of films by varying the lift-up rate of a substrate and a concentration of the colloidal suspension. Addition of water-soluble polymer such as polyvinylpyrrolidone in the suspension reduced the defect of films because of similar capillary forces between particles. We also fabricated a polystyrene particles terminated carboxylic group. The particles could be reacted with amine groups in bio-system by forming amide bonds. Specific bindings between functional groups in films and target molecules could be verified from the shift of reflection spectra of the films and it would make functionalized colloidal crystal films for biosensors.