

Development of three dimensional polystyrene particles arrays for template applications

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In recent years, three dimensional polymer particle arrays have been attracted as functional templates for numerous applications of sensors, solar cells, lithium ion batteries and super capacitors. In the respect to self-assembly of polymer particles, key parameters were investigated with particle size distribution, surface tension and colloidal dispersion. In particular, the distribution of polymer particle size has to be narrow, which is first requirement leading to well-ordered hexagonal patterns of polymer particles.

In this study, monodisperse polystyrene (PS) particles were synthesized with particle diameter of 2  $\mu\text{m}$  by adjusting reaction conditions of solvent, initiator, surfactant, stabilizer and temperature. Then, 3D self-assembly of PS particles was conducted with 20  $\mu\text{m}$  thickness on FTO glass via Xia-method. Finally, we are going to develop functional inverse opal structures for electronic devices via removing PS particle array after infiltration of functional inorganic nanoparticles. This research was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (2016R1C1B1010884).