Functional Hollow Silica Monolayers Formed on Substrates Through the Long-Range Electrostatic Interactions

우희제, 오세원, 차국헌*
서울대학교
(khchar@plaza.snu.ac.kr*)

In the present study, we propose a novel strategy to prepare well-aligned hollow silica monolayers employing the electrostatic interactions between charged nanospheres and substrates. Positively charged polystyrene (PS) nanospheres were first synthesized using styrene as a monomer, 2,2-azobis-(isobutyramidine) dihydrochloride (AIBA) as an initiator as well as poly(vinyl pyrrolidone) (PVP) as a stabilizer and a cosurfactant by dispersion polymerization. PS/SiO_2 core/shell nanospheres with negatively charged surface were then prepared using positively charged PS nanospheres as templates and tetraethyl orthosilicate (TEOS) as a silica precursor by the sol-gel method. The prepared PS/SiO_2 core/shell nanospheres were deposited onto Si wafer substrates with different surface charges by spin coating. On the substrate with positively charged surface, well-aligned PS/SiO_2 core/shell nanosphere monolayers were obtained. After calcination, uniform and monolayered hollow silica arrays were achieved.