

Synthesis of Monodisperse Silica Nanospheres to Fabricate Photonic Structures

박찬호, 조수정, 이해수, 이준석, 양승만*
한국과학기술원
(sm_yang@kaist.ac.kr*)

The iridescent colors of nature stem from photonic structures which can be utilized for the applications such as bio-micro sensors or reflective display sources. Silica nanospheres are the most common materials that can be applied as building blocks for photonic crystals. Here, we conducted sol-gel process to prepare silica nanospheres, which contains hydrolysis and condensation to form Si-O-Si bridges. Size and quality control of silica nanospheres were successfully achieved by two-step reactions, seeding and regrowth. The size values ranged from 120 to 1000 nm accompanying high monodispersity. Moreover, silica suspensions after changing the medium from ethanol to ethoxylated trimethylolpropane triacrylate (ETPTA) enabled formation of silica and polymeric ETPTA composites which have the size dependent red, green and blue colors with specific reflection peaks, following the Bragg's equation.