

### Silica embedded polymer photonic balls by core-shell particles

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A material that reflects light at a specific wavelength due to periodic repetition of the refractive index is called photonic crystal. At this time, the wavelength of the reflected light is determined according to the refractive index and the repetition period of the refractive index. Such materials have been studied since the 1980s, and in recent studies, structures have been implemented in the form of films and microballs. In this study, we implemented a structure having the same periodic refractive index through silica-polymer core-shell particles with silica nanoparticles as the core. Since uniform core-shell particles having a polymer shell can be easily deformed by heat and solvent, it is possible to use core-shell particles as a material for photonic crystals. In addition, such a photonic crystal material can easily adjust the refractive index period according to the size ratio. In addition, due to the different characteristics of the core and the shell, swelling of the polymer shell occurs in organic solvent is present. Therefore, the silica-polymer core-shell particles are expected to be used in various ways in studies based on photonic crystal materials in future studies.