

## Biodegradable Inverse Opals with Controlled Discoloration

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Inverse opals are face-centered cubic crystals composed of a close-packed array of air cavities embedded in a solid matrix. As inverse opals have the periodic modulation of refractive index, they exhibit pronounced structural colors at stop band wavelength. Here, we create inverse opals made of biodegradable polymer, poly(lactic-co-glycolic acid) (PLGA), to use them as indicators for valid periods of drugs and cosmetics. To make the structure, we employ a capillary wetting process of opals composed of silica nanospheres into a film of PLGA at elevated temperature. The opals maintain their crystal structure during the embedding process. The selective removal of opal template from PLGA film leaves biodegradable inverse opals. The inverse opals show degradation and discoloration of which rate depends on the environmental conditions.