

Fabrication of three-dimensional metallic photonic crystals

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The concept of three-dimensional (3D) photonic crystals (PCs) has stimulated extensive research on discovery of novel fabrication methods, including self-assembly of colloidal particle, layer-by-layer photolithography, and holographic lithography and on the study of the photonic bandgap properties of such produced structures. These periodic arrays of dielectric materials provide a new platform for photonic and optoelectronic applications. Recently, there are growing interests in metallic photonic crystals due to new optical properties, including thermally stimulated emission, multiple bandgaps, and plasmonic properties. Here, we demonstrate metallic photonic crystals through various sacrificial templates formed by colloidal assemblies and holographic lithography. The coating of metals into 3D structures was achieved by electroless deposition method. The morphology and optical properties of metallic 3D structures were studied by SEM and spectroscopy, respectively.