

Preparation and Properties of Two-Dimensional PLZT Photonic Crystals Using a Sol-Gel Method

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Abstract

Lead lanthanum zirconate titanate (PLZT) films with an array of air-holes were successfully fabricated on platinum deposited (001) magnesium oxide substrates using a sol-gel method with resist molds. PLZT precursor solution was cast into the mold with resist pillars patterned by electron beam lithography. After the burning process of resist pillars, the PLZT ceramic films with air-holes were obtained. The patterned PLZT film was grown epitaxially on the substrate and the ferroelectric strain was observed by external electric field. The reflection peaks were also observed by an optical measurement on the PLZT film with a hexagonal array of air-holes. The frequency ranges of the reflection peaks were coincided with that of the calculated photonic band structures. We believed that this periodic structure and the process were suitable for the preparation of the tunable photonic crystals