

Mn-doped 0.15BiInO₃-0.85PbTiO₃ Piezoelectric Films Deposited by Pulsed Laser Deposition

Author(s): S.Y. Lee^{1,2}; S.W. Ko²; S. Lee²; and S. Trolier-McKinstry²

Source: APPLIED PHYSICS LETTERS **Volume:** 100 **Issue:** 21 **Article Number:** 212905
DOI: 10.1063/1.4718528 **Published:** MAY 21 2012

Abstract: Undoped, 0.5 and 1.0mol.% Mn-doped 0.15BiInO(3)-0.85PbTiO(3) films were grown on PbTiO3/Pt/Ti/SiO2/Si substrates by pulsed laser deposition. Phase-pure perovskite films were obtained at a substrate temperature of 585 degrees C irrespective of Mn doping level. The 0.5mol.% Mn-doped films showed a room temperature permittivity of 480 and a dielectric loss tangent of 0.015 at 100 kHz after 650 degrees C post-deposition annealing. The coercive field and remanent polarization were 80 kV/cm and 29 mu C/cm(2), respectively. The ferroelectric transition temperature of the films ranged from 535 to 585 degrees C. The e(31,f) piezoelectric coefficient was -7.1C/m(2). X-ray diffraction and phase transition temperature data showed that the Mn atoms substitute on the Ti-site as Mn³⁺; the resulting films have p-type conduction characteristics. (C) 2012 American Institute of Physics. [<http://dx.doi.org/10.1063/1.4718528>]

Addresses:

1. Univ Ulsan, Dept Phys, Ulsan 680749, South Korea
2. Penn State Univ, Mat Res Inst, University Pk, PA 16802 USA