

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Synthesis and properties of multiferroic Bi(Fe,Cr)O₃ thin films S. FUJINO, M. MURAKAMI, S.-H. LIM, C. LONG, L. SALAMANCA-RIBA, Univ. of MD, H. SUGAYA, Tokyo Inst. of Technology, T. HASEGAWA, Univ. of Tokyo, S. LOFLAND, Rowan Univ., M. WUTTIG, I. TAKEUCHI, Univ. of MD — Bi based magnetic oxide systems, including BiFeO₃ and BiCrO₃, have spontaneous magnetization and display charge polarization. Bi(Fe,Cr)O₃ system has been predicted to be a new candidate of multiferroic materials. In this study, we will present systematic investigation of multiferroic properties of Bi(Fe,Cr)O₃ thin films. The films are fabricated by pulsed laser deposition under various deposition conditions. We have succeeded in synthesizing single phase epitaxial BiCrO₃ films on LaAlO₃ (001), SrTiO₃ (001) and NdGaO₃ (110) substrates. It shows weak ferromagnetic behavior with the Curie temperature at 120 K. Pseudo-binary epitaxial thin film composition spreads of BiFe_{1-x}Cr_xO₃ have been fabricated using the combinatorial pulsed laser deposition technique in order to investigate their changing multiferroic properties as a function of composition. Their magnetic and dielectric properties mapped using low temperature scanning SQUID microscopy and microwave microscopy will be discussed. This work was supported by ONR N000140110761, ONR N000140410085, NSF DMR 0094265 (CAREER), NSF DMR 0231291, MRSEC DMR-00-0520471, and W. M. Keck Foundation.

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Date submitted: 04 Dec 2005

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