

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Probing of spontaneous polarization screened by defect-induced free carriers in gallium ferrite thin films** S.H. OH, Ewha Womans University, R.H. SHIN, Ewha Womans University, CNRS-EWHA International Research Center, W. JO<sup>1</sup>, Ewha Womans University, C. LEFEVRE, Ewha Womans University, CNRS-EWHA International Research Center, Institute of Physics and Chemistry of Materials of Strasbourg, F. ROULLAND, A. THOMASSN, C. MENY, N. VIART, Institute of Physics and Chemistry of Materials of Strasbourg — Gallium ferrite, GaFeO<sub>3</sub> (GFO), is known as a potential multiferroic material with spontaneous polarization and magnetization [1,2]. However, it was difficult to measure the polarization reversal of GFO thin films because conduction electrons screen the polarization switching responsible for ferroelectricity. Therefore, controlling charge conduction of a multiferroic material is key issue. In this study, we investigated the carrier transport behavior and the charge conduction mechanism in epitaxial GFO thin films deposited on metallic oxide-coated single crystal SrTiO<sub>3</sub> substrates by pulsed laser deposition. Macroscopic carrier transports result showed that the interface limited model was the dominant conduction mechanism of the large leakage current and the nature of carrier transport at interface between GFO thin films and substrates was demonstrated by band profiles. Local charge conduction of GFO thin films was studied by conducting atomic force microscope. The polarization switching behavior of GFO thin films was showed by polarization-electric field curve and the positive-up-negative-down method. [1] A. Roy et al., J. Phys.: Condens. Matter 23 (2011) 325902. [2] D. Stoeffler, J. Phys.: Condens. Matter 24 (2012) 185502.

<sup>1</sup>corresponding author

S. H. Oh  
Ewha Womans University

Date submitted: 27 Dec 2012

Electronic form version 1.4