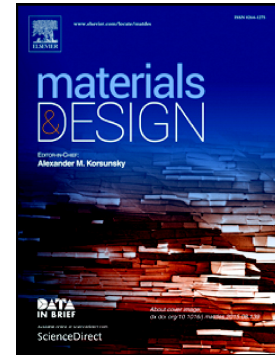


Accepted Manuscript

Intrinsic dead layer effects in relaxed epitaxial BaTiO₃ thin film grown by pulsed laser deposition

Y. Gagou, J. Belhadi, B. Asbani, M. El Marssi, J-L Dellis, Yu. I. Yuzyuk, I.P. Raevski, J.F Scott



PII: S0264-1275(17)30237-X
DOI: doi: [10.1016/j.matdes.2017.03.001](https://doi.org/10.1016/j.matdes.2017.03.001)
Reference: JMADE 2835

To appear in: *Materials & Design*

Received date: 16 October 2016
Revised date: 28 February 2017
Accepted date: 1 March 2017

Please cite this article as: Y. Gagou, J. Belhadi, B. Asbani, M. El Marssi, J-L Dellis, Yu. I. Yuzyuk, I.P. Raevski, J.F Scott, Intrinsic dead layer effects in relaxed epitaxial BaTiO₃ thin film grown by pulsed laser deposition. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Jmade(2017), doi: [10.1016/j.matdes.2017.03.001](https://doi.org/10.1016/j.matdes.2017.03.001)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Intrinsic dead layer effects in relaxed epitaxial BaTiO₃ thin film grown by pulsed laser deposition

Y. Gagou¹, J. Belhadi¹, B. Asbani¹, M. El Marssi¹, J-L Dellis¹, Yu. I. Yuzyuk², I. P. Raevski² and J. F Scott³.

¹ Université de Picardie Jules Verne, LPMC, 33 rue Saint-Leu, F-80039 Amiens, France

² Southern Federal University, Faculty of Physics, Zorge 5, Rostov-on-Don 344090, Russia

³ Depts. of Chemistry and Physics, St. Andrews University, St. Andrews, Scotland KY16 9ST

Abstract

Epitaxial BaTiO₃ (BT) thin film of about 400 nm thickness was grown on LaSr_{0.5}Co_{0.5}O₃ (LSCO) coated (001)MgO using pulsed laser deposition. Ferroelectric properties of the BT thin film in Pt/BT/LSCO/MgO heterostructure capacitor configuration were investigated. Dynamic P-E hysteresis loops at room temperature showed ferroelectric behavior with $P_s = 32 \mu\text{C}/\text{cm}^2$, $P_r = 14 \mu\text{C}/\text{cm}^2$ and $E_c = 65 \text{ kV}/\text{cm}$. Static C-V measurements confirmed reversible switching with a coercive field $E_c = 15 \text{ kV}/\text{cm}$. Basing on a model taking into account an interface dead-layer we show that the capacitance-voltage “butterfly” loops imply only 25% switching of dipoles that inferred from dynamic polarization-field loops (~ 4 and $\sim 16 \text{ kV}/\text{cm}$, respectively). Dielectric permittivity as a function of temperature revealed a first-order ferroelectric-to-paraelectric (FE-PE) phase transition in the BT film characterized by a maximum at $T_C \sim 130^\circ\text{C}$. The very large ($\sim 126 \text{ K}$ at 1 kHz) difference between T_C and the extrapolated Curie-Weiss temperature T_0 is attributed to the dead-layer effects.

Keywords: Dead layer, Ferroelectric, BaTiO₃, Epitaxial growth, Pulsed laser deposition

Corresponding author: yaovi.gagou@u-picardie.fr

Download English Version:

<https://daneshyari.com/en/article/5024155>

Download Persian Version:

<https://daneshyari.com/article/5024155>

[Daneshyari.com](https://daneshyari.com)