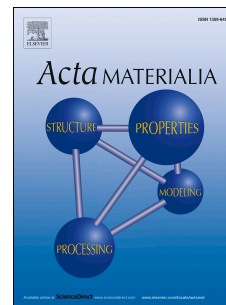


# Accepted Manuscript

Strong composition dependence of resistive switching in  $Ba_{1-x}Sr_xTiO_3$  thin films on semiconducting substrates and its thermodynamic analysis

O. Mohammadmoradi, C. Sen, A.G. Boni, L. Pintilie, I.B. Misirlioglu



PII: S1359-6454(18)30116-2

DOI: [10.1016/j.actamat.2018.02.015](https://doi.org/10.1016/j.actamat.2018.02.015)

Reference: AM 14371

To appear in: *Acta Materialia*

Received Date: 31 August 2017

Revised Date: 3 February 2018

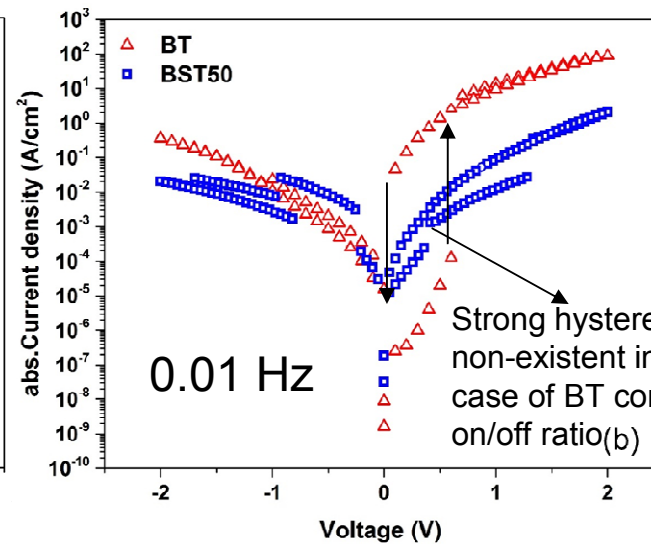
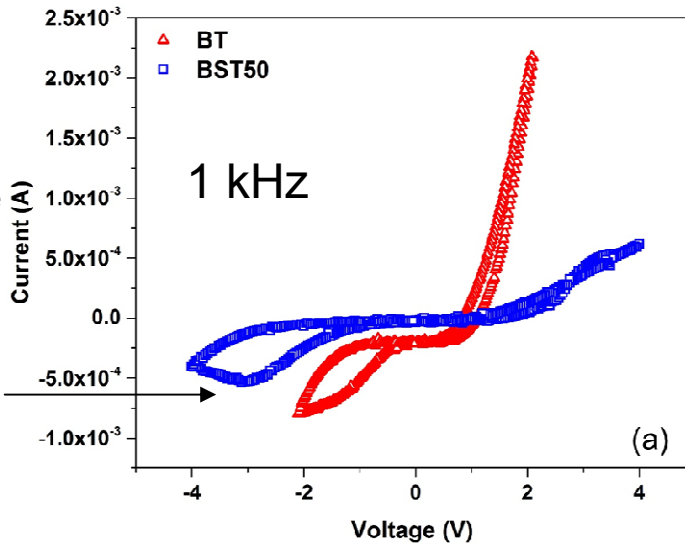
Accepted Date: 6 February 2018

Please cite this article as: O. Mohammadmoradi, C. Sen, A.G. Boni, L. Pintilie, I.B. Misirlioglu, Strong composition dependence of resistive switching in  $Ba_{1-x}Sr_xTiO_3$  thin films on semiconducting substrates and its thermodynamic analysis, *Acta Materialia* (2018), doi: 10.1016/j.actamat.2018.02.015.

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.

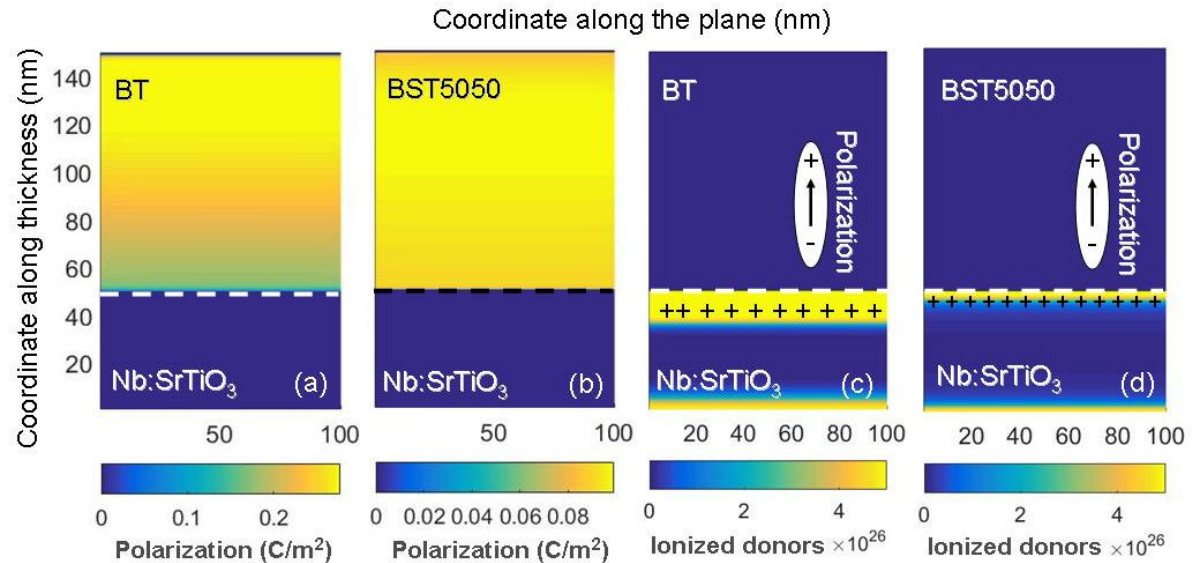
# Strong dependence of resistive switching on composition in Ba<sub>1-x</sub>Sr<sub>x</sub>TiO<sub>3</sub> thin films on semiconducting substrates and its thermodynamic analysis

Hystereses on the negative bias is probably due to trap effects, no ferroelectric polarization. Such an effect is not observed at low frequency.



Strong hysteresis in BT, almost non-existent in BST5050. The case of BT corresponds to large on/off ratio(b)

We examine both experimentally and theoretically the origin of the hystereses in the I-V curves of BaTiO<sub>3</sub> (BT) and Ba<sub>0.5</sub>Sr<sub>0.5</sub>TiO<sub>3</sub> (BST5050) films grown on Nb doped SrTiO<sub>3</sub> oxide semiconductor substrates. We show that the hystereses depend on composition as well as frequency of measurement in the sense that as the frequency becomes lower, the hysteresis, particularly in BaTiO<sub>3</sub> become more prominent, an indication of effect of polarization on leakage currents. The leakage depends on the direction of polarization via the accumulation and depletion states generated on the oxide semiconductor side which we unambiguously show with theoretical calculations. BaTiO<sub>3</sub> has higher leakage currents than Ba<sub>0.5</sub>Sr<sub>0.5</sub>TiO<sub>3</sub> owing to its stronger ferroelectric polarization.



Theoretical results showing the relation between polarization direction and carrier depletion (ionized donors) in our films

Download English Version:

<https://daneshyari.com/en/article/7876541>

Download Persian Version:

<https://daneshyari.com/article/7876541>

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