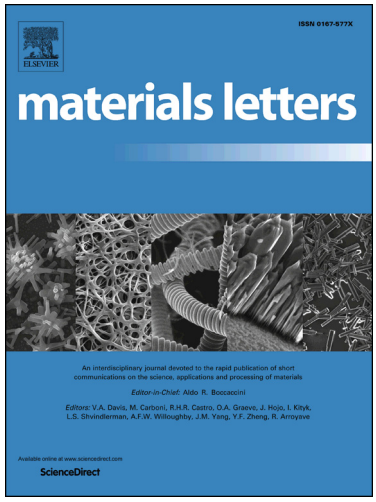
Accepted Manuscript



X-ray photoelectron spectroscopy studies of electronic structure of $Nd_{2-x}Ce_xCuO_{4-y}$ and $YBa_2Cu_3O_{7-y}$ epitaxial film surfaces and resistive switchings in high temperature superconductor-based heterostructures

N.A. Tulina, A.A. Ivanov, A.N. Rossolenko, I.M. Shmytko, A.M. Ionov, R.N. Mozhchil, S.I. Bozhko, I.Yu. Borisenko, V.A. Tulin

PII: S0167-577X(17)30827-3
DOI: http://dx.doi.org/10.1016/j.matlet.2017.05.091
Reference: MLBLUE 22666

To appear in: *Materials Letters*

Received Date: 11 April 2017
Revised Date: 22 May 2017
Accepted Date: 23 May 2017

Please cite this article as: N.A. Tulina, A.A. Ivanov, A.N. Rossolenko, I.M. Shmytko, A.M. Ionov, R.N. Mozhchil, S.I. Bozhko, I.Yu. Borisenko, V.A. Tulin, X-ray photoelectron spectroscopy studies of electronic structure of $Nd_{2-x}Ce_xCuO_{4-y}$ and $YBa_2Cu_3O_{7-y}$ epitaxial film surfaces and resistive switchings in high temperature superconductor-based heterostructures, *Materials Letters* (2017), doi: http://dx.doi.org/10.1016/j.matlet.2017.05.091

X-ray photoelectron spectroscopy studies of electronic structure of $Nd_{2-x}Ce_xCuO_{4-y}$ and $YBa_2Cu_3O_{7-y}$ epitaxial film surfaces and resistive switchings in high temperature superconductor-based heterostructures

N.A. Tulina[1], A.A. Ivanov[3], A.N. Rossolenko[1], I.M. Shmytko[1], A.M. Ionov[1], R.N. Mozhchil[3,1], S.I. Bozhko[1], I.Yu. Borisenko[2], V.A. Tulin [2]

[1] Institute of Solid State Physics, Russian Academy of Sciences, Chernogolovka, tulina@issp.ac.ru

[2]Institute of Microelectronics Technology and High Purity Materials, Russian Academy of Sciences, Chernogolovka

[3]National Research Nuclear University MEPhI, Moscow

Abstract

Bipolar effect of resistive switchings (BERS) in epitaxial film-based heterostructures $Nd_{2-x}Ce_xCuO_{4-y}$ and $YBa_2Cu_3O_{7-y}$ is investigated in the paper using the fundamental properties of the HTSC parent compounds - antiferromagnetic Mott insulators, which exhibiting a transition between a metal and an insulator owing to oxygen doping. The studies of electronic structure of the NCCO and YBCO epitaxial films surfaces by XPS and AFM have shown that the surface layer (~30 nm) doped with oxygen is changing from metal (in a film bulk) to insulate state on the surface. The current-voltage characteristics of BERS devices obey a diode-like model upon the approach based on the double-diode equation**.**

Keywords: Interface structures; X-ray techniques; XPS; Bipolar resistive switchings; Superconductors; Oxygen vacancies