

## Accepted Manuscript

Title: Electrical-field induced nonlinear conductive behavior  
in dense zirconia ceramic

Authors: Yan Gao, Fangzhou Liu, Dianguang Liu, Jinling Liu,  
Yiguang Wang, Linan An

PII: S1005-0302(17)30078-6  
DOI: <http://dx.doi.org/doi:10.1016/j.jmst.2017.03.005>  
Reference: JMST 939

To appear in:

Received date: 13-11-2016  
Revised date: 1-2-2017  
Accepted date: 28-2-2017

Please cite this article as: Yan Gao, Fangzhou Liu, Dianguang Liu, Jinling Liu, Yiguang Wang, Linan An, Electrical-field induced nonlinear conductive behavior in dense zirconia ceramic, <http://dx.doi.org/10.1016/j.jmst.2017.03.005>

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.

**Electrical-field induced nonlinear conductive behavior in dense zirconia ceramic**

Yan Gao<sup>a</sup>, Fangzhou Liu<sup>b</sup>, Dianguang Liu<sup>b</sup>, Jinling Liu<sup>a</sup>, Yiguang Wang<sup>b</sup>, Linan An<sup>c,\*</sup>

<sup>a</sup>State Key Laboratory of Traction Power, School of Mechanics and Engineering, Southwest Jiaotong University, Chengdu 610031, China

<sup>b</sup>School of Materials Science and Engineering, Northwestern Polytechnical University, Xi'an 710072, China

<sup>c</sup>Department of Materials Science and Engineering, Advanced Materials Processing and Analysis Center, University of Central Florida, Orlando, FL 32816, USA.

Corresponding author. E-mail address: linan.an@ucf.edu

[Received 13 November 2016; Received in revised form 1 February 2017; Accepted 28 February 2017]

**Abstract:** The effect of the applied electric field on the conductive behavior of zirconia ceramics is studied by measuring its initial current-voltage curve at various temperatures. The results show that when the field strength is higher than the threshold for flash-sintering, the curves exhibit a nonlinear behavior by having an additional current on top of the linear current according to Ohm's law. Analyzing its transport behavior reveals that the additional current density is due to the extra oxygen vacancies induced by the electric field. The formation rate of the extra vacancies and associated current was related to the field strength.

Download English Version:

<https://daneshyari.com/en/article/5451681>

Download Persian Version:

<https://daneshyari.com/article/5451681>

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