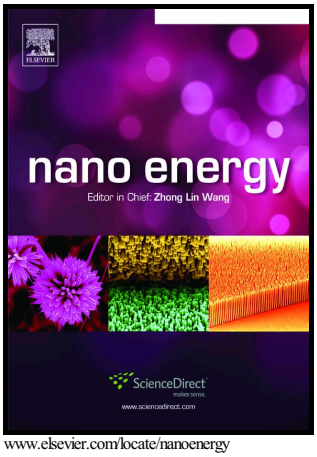
Engineering spherical lead zirconate titanate to explore the essence of piezo-catalysis

Yawei Feng, Lili Ling, Yanxu Wang, Zhenmin Xu, Fenglei Cao, Hexing Li, Zhenfeng Bian



www.elsevier.com/locate/nanoenergy

PII: S2211-2855(17)30534-7
DOI: http://dx.doi.org/10.1016/j.nanoen.2017.08.058
Reference: NANOEN2172

To appear in: *Nano Energy*

Received date: 2 July 2017
Revised date: 13 August 2017
Accepted date: 30 August 2017

Cite this article as: Yawei Feng, Lili Ling, Yanxu Wang, Zhenmin Xu, Fenglei Cao, Hexing Li and Zhenfeng Bian, Engineering spherical lead zirconate titanate to explore the essence of piezo-catalysis, *Nano Energy,* http://dx.doi.org/10.1016/j.nanoen.2017.08.058

Engineering spherical lead zirconate titanate to explore the essence of piezo-catalysis

Yawei Feng, Lili Ling, Yanxu Wang, Zhenmin Xu, Fenglei Cao, Hexing Li, Zhenfeng Bian**

Education Ministry Key and International Joint Lab of Resource Chemistry and Shanghai Key Lab of Rare Earth Functional Materials, Shanghai Normal University, Shanghai 200234, PR China

* Corresponding authors: bianzhenfeng@shnu.edu.cn, hexing-li@shnu.edu.cn

Abstract

Piezo-catalysis induced by piezoelectric polarization has been proven to be a powerful technology for potential applications in the energy and environment. It is generally accepted that piezo-catalysis derived the easily deformation from the piezoelectric materials with one or two dimensions. In this study, piezoelectric materials lead zirconate titanate (PZT) with a spherical morphology was synthesized, which is used to explore whether the widely accepted principle that is one or two-dimensional structure is necessary in the piezo-catalysis process is exclusive. We would like to clarify the relationship between deformation and piezoelectric catalytic performance. In addition, a key fundamental problem that has not yet been fully solved whether the charges of the reaction are from polarized charges or free charges. We investigate the role of polarization charges and free charges in piezoelectric catalysis by doping the piezoelectric