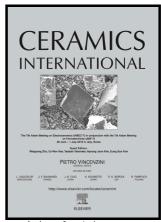
Author's Accepted Manuscript

A review of an innovative concept to increase the toughness of the ceramics by piezoelectric secondary phases

Alok Singh Verma, Devendra Kumar, Ashutosh Kumar Dubey



www.elsevier.com/locate/ceri

PII: S0272-8842(18)31492-5

DOI: https://doi.org/10.1016/j.ceramint.2018.06.063

Reference: CERI18507

To appear in: Ceramics International

Received date: 10 April 2018 Revised date: 8 June 2018 Accepted date: 8 June 2018

Cite this article as: Alok Singh Verma, Devendra Kumar and Ashutosh Kumar Dubey, A review of an innovative concept to increase the toughness of the ceramics by piezoelectric secondary phases, *Ceramics International*, https://doi.org/10.1016/j.ceramint.2018.06.063

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 galley proof before it is published in its final citable 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.

CCEPTED MANUSCRIPT

A review of an innovative concept to increase the toughness of the ceramics by

piezoelectric secondary phases

Alok Singh Verma, Devendra Kumar, Ashutosh Kumar Dubey*

Department of Ceramic Engineering, Indian Institute of Technology (Banaras Hindu

University) Varanasi – 221005, INDIA

*Corresponding author: A. K. Dubey. akdubey.cer@iitbhu.ac.in

Abstract

Despite of wide range scope of ceramics for various applications, such as healthcare, space, and

energy storage etc., poor fracture toughness restricts their multifunctional performance. The

development of various techniques/approaches to improve the fracture toughness of ceramics is

in continuum thrust. The present work reviews one of the novel techniques to enhance the

toughness of ceramics with the incorporation of piezoelectric secondary phase in the matrix. In

addition to the piezoelectricity induced toughening mechanisms such as, energy dissipation due

to electro-mechanical phenomenon as well as stress-induced domain switching toughening, other

toughening mechanisms such as, transformation toughening, crack bridging, crack deflection and

microcrack toughening also contributes to the total observed toughening of piezo-composites. As

far as the piezoelectricity induced toughening is concerned, the poling direction and electrical

field parameters also affect the toughness of the ceramics.

Keywords: Toughening mechanism, Piezoelectricity, Domain switching.

1

Download English Version:

https://daneshyari.com/en/article/7885733

Download Persian Version:

https://daneshyari.com/article/7885733

<u>Daneshyari.com</u>