

Phase structure and thermal conductivities of Er_2O_3 stabilized ZrO_2 toughened $\text{Gd}_2\text{Zr}_2\text{O}_7$ ceramics for thermal barrier coatings

Mingzhu Li, Lei Guo, Fuxing Ye



www.elsevier.com/locate/ceri

PII: S0272-8842(16)31145-2
DOI: <http://dx.doi.org/10.1016/j.ceramint.2016.07.079>
Reference: CERI13304

To appear in: *Ceramics International*

Received date: 7 June 2016

Revised date: 12 July 2016

Accepted date: 12 July 2016

Cite this article as: Mingzhu Li, Lei Guo and Fuxing Ye, Phase structure and thermal conductivities of Er_2O_3 stabilized ZrO_2 toughened $\text{Gd}_2\text{Zr}_2\text{O}_7$ ceramic for thermal barrier coatings, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2016.07.079>

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.

Phase structure and thermal conductivities of Er₂O₃ stabilized ZrO₂
toughened Gd₂Zr₂O₇ ceramics for thermal barrier coatings

Mingzhu Li ^{a,b}, Lei Guo ^{a,b,c,*}, Fuxing Ye ^{a,b,c}

^a School of Materials Science and Engineering, Tianjin University

^b Tianjin Key Laboratory of Advanced Joining Technology, Tianjin University

^c Key Lab of Advanced Ceramics and Machining Technology of Ministry of Education, Tianjin University, No. 92, Weijin Road, Tianjin 300072, China

*** Corresponding author:**

Lei Guo

Tel: +86 22 2740 6261; Fax: +86 22 2740 7022; E-mail address: glei028@tju.edu.cn.

Abstract

3.5 mol% Er₂O₃ stabilized ZrO₂ (ErSZ) and Gd₂Zr₂O₇ powders were produced by a chemical co-precipitation and calcination method, and ErSZ was used to toughen Gd₂Zr₂O₇. The phase structure, toughness and thermal conductivities of ErSZ toughened Gd₂Zr₂O₇ ceramics were investigated. When the ErSZ content was below 15 mol%, the compound consisted of pyrochlore phase, the ordering degree of which decreased with the increase of the ErSZ content. High ErSZ doping led to the formation of metastable tetragonal (t') phase in the compound. The addition of ErSZ in Gd₂Zr₂O₇ benefited its toughness, mainly attributable to the presence of t' phase in the compound. With the increase of the ErSZ content in the compound, the thermal conductivity first decreased and then showed an upward tendency, and 10 mol% ErSZ toughened Gd₂Zr₂O₇ exhibited the lowest thermal conductivity.

Download English Version:

<https://daneshyari.com/en/article/5438703>

Download Persian Version:

<https://daneshyari.com/article/5438703>

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