

Author's Accepted Manuscript

Zirconia Ceramics with Additions of Alumina for
Advanced Tribological and Biomedical
Applications

M.H. Ghaemi, S. Reichert, A. Krupa, M. Sawczak,
A. Zykova, K. Lobach, S. Sayenko, Y. Svitlychnyi



www.elsevier.com/locate/ceri

PII: S0272-8842(17)30768-X
DOI: <http://dx.doi.org/10.1016/j.ceramint.2017.04.150>
Reference: CER115130

To appear in: *Ceramics International*

Received date: 21 December 2016
Revised date: 28 March 2017
Accepted date: 26 April 2017

Cite this article as: M.H. Ghaemi, S. Reichert, A. Krupa, M. Sawczak, A. Zykova, K. Lobach, S. Sayenko and Y. Svitlychnyi, Zirconia Ceramics with Additions of Alumina for Advanced Tribological and Biomedical Applications, *Ceramics International*, <http://dx.doi.org/10.1016/j.ceramint.2017.04.150>

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 a 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.

Zirconia Ceramics with Additions of Alumina for Advanced Tribological and Biomedical Applications

M. H. Ghaemi¹, S. Reichert², A. Krupa³, M. Sawczak³, A. Zykova⁴, K. Lobach⁴, S. Sayenko⁴, Y. Svitlychnyi⁴

¹Gdansk University of Technology , G. Narutowicza 11/12, 80-233, Gdansk, Poland, Corresponding author, ghaemi@pg.gda.pl

²Karlsruhe Institute of Technology, Kaiserstr. 10, 76-131 Karlsruhe, Germany

³Institute of Fluid-Flow Machinery Polish Academy of Science, J. Fiszer, 14, 80-952, Gdansk, Poland

⁴NSC Kharkov Institute Physics & Technology NASU, Akademicheskaya, 1, 61-108, Kharkov, Ukraine

Abstract

The results of an investigation on slip cast and sintered Y_2O_3 (3 wt%)- stabilized ZrO_2 with additions of 5, 10, 15 wt% Al_2O_3 are reported. The surface roughness, porosity and density of the samples were measured. The hardness HRC and Hv, fracture toughness K_{1C} , and friction coefficients were also measured using standard methods. The structural properties of the samples were observed by Scanning Electron Microscopy (SEM). The surface topography was evaluated by means of Chromatic White Light Interferometry using MicroSpy® Topo of FRT Rauheit Kontur before and after tribological tests. The phase and chemical composition were analyzed by X-Ray Diffractometry (XRD), Energy Dispersive X-ray (EDX) spectroscopy, and Raman spectroscopy. Results show that the addition of Al_2O_3 into YSZ ceramics in the range of 5–10% allows the mechanical and tribological characteristics of the material that can be applied in different mechanical machines for different metallurgical processes to be improved, as well as in chemical engineering or medicine.

Keywords: Ceramics; yttria-stabilized zirconia, composites; mechanical properties, tribological performance

1. Introduction

The special properties of ceramic materials are becoming increasingly important for many applications in electrical, chemical and mechanical engineering. Oxide ceramic materials are used in a

Download English Version:

<https://daneshyari.com/en/article/5437626>

Download Persian Version:

<https://daneshyari.com/article/5437626>

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