

Accepted Manuscript

Modeling the temperature and test rate dependent fracture strength of zirconia and alumina single crystal fibers

Jiaxing Shao, Weiguo Li, Ruzhuan Wang, Yong Deng, Jianzuo Ma, Yangyuan Zhang, Yuchen Lai



PII: S1359-8368(17)32172-8

DOI: [10.1016/j.compositesb.2017.09.022](https://doi.org/10.1016/j.compositesb.2017.09.022)

Reference: JCOMB 5268

To appear in: *Composites Part B*

Received Date: 28 June 2017

Revised Date: 5 September 2017

Accepted Date: 8 September 2017

Please cite this article as: Shao J, Li W, Wang R, Deng Y, Ma J, Zhang Y, Lai Y, Modeling the temperature and test rate dependent fracture strength of zirconia and alumina single crystal fibers, *Composites Part B* (2017), doi: 10.1016/j.compositesb.2017.09.022.

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.

Modeling the temperature and test rate dependent fracture strength of zirconia and alumina single crystal fibers

Jiaxing Shao ^a, Weiguo Li ^{a*}, Ruzhuan Wang ^b, Yong Deng ^a, Jianzuo Ma ^a, Yangyuan Zhang ^c,

Yuchen Lai ^c

^a *State Key Laboratory of Coal Mine Disaster Dynamics and Control, College of Aerospace Engineering, Chongqing University, Chongqing 400030, China*

^b *Chongqing Key Laboratory of Nano-Micro Composite Materials and Devices, School of Metallurgy and Materials Engineering, Chongqing University of Science and Technology, Chongqing 401331, China*

^c *Chongqing Nankai Secondary School, Chongqing 400030, China*

Abstract

In this paper, based on the Griffith fracture theory, the slow crack growth theory and the temperature-dependent fracture surface energy model, a temperature and test rate dependent fracture strength model for zirconia and alumina single crystal fibers was established. As a comparison, the other one based on the temperature-dependent free surface energy was also deduced and discussed. These models were verified by comparison with the experimental data of the two types of ceramic single crystal fibers. Good agreement between the model predictions and the experimental data was obtained. Moreover, based on the present model and the existing material parameters, the influencing factor analysis for these ceramic single crystal fibers were systematically conducted. Some new findings regarding their high temperature fracture strengths

* Corresponding author.
E-mail address: wgli@cqu.edu.cn (W.G. Li).
Telephones: +86 13452029896 (Mobile)
Fax: +86 023 65102421

Download English Version:

<https://daneshyari.com/en/article/7212398>

Download Persian Version:

<https://daneshyari.com/article/7212398>

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