

Accepted Manuscript

Stress concentration of a crack-like spheroidal cavity lying on the prism plane of hexagonal crystals

Chun-Ron Chiang

PII: S0013-7944(17)30625-2
DOI: <http://dx.doi.org/10.1016/j.engfracmech.2017.09.004>
Reference: EFM 5675

To appear in: *Engineering Fracture Mechanics*

Received Date: 14 June 2017
Revised Date: 30 August 2017
Accepted Date: 3 September 2017

Please cite this article as: Chiang, C-R., Stress concentration of a crack-like spheroidal cavity lying on the prism plane of hexagonal crystals, *Engineering Fracture Mechanics* (2017), doi: <http://dx.doi.org/10.1016/j.engfracmech.2017.09.004>

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.



Stress concentration of a crack-like spheroidal cavity lying on the prism plane of hexagonal crystals

Chun-Ron Chiang

Department of Power Mechanical Engineering

National Tsing Hua University

Hsin Chu 30013, Taiwan

Tel +886 3 5715131 ext-33758, fax +886 3 5722840

e-mail: crchiang@pme.nthu.edu.tw; chunron.chiang@gmail.com

Abstract

Stress concentration factors around a crack-like spheroidal cavity lying on the prism plane of hexagonal crystals are determined by the equivalent inclusion method. The stress concentration factor is shown to be a product of two factors. One of the factors is purely geometric: the aspect ratio of the cavity and the other is characterized by the elastic properties of the material. The stress intensity factors of the related penny-shaped crack are deduced from the numerical results by reducing the aspect ratio of the cavity to zero. Results of several hexagonal single crystals including beryllium, graphite, magnesium, titanium and zinc are presented to show the influence of the material properties on the solution.

Key Words: stress concentration factor; stress intensity factor; equivalent inclusion method; penny-shaped crack; hexagonal crystal.

Download English Version:

<https://daneshyari.com/en/article/5013778>

Download Persian Version:

<https://daneshyari.com/article/5013778>

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