

Accepted Manuscript

Effects of z-pin's porosity on shear properties of 2D C/SiC z-pinned joint

Yi Zhang, Litong Zhang, Jiaxin Zhang, Xiaowei Yin, Chidong Liu

PII: S0263-8223(16)32455-2

DOI: <http://dx.doi.org/10.1016/j.compstruct.2017.04.013>

Reference: COST 8444

To appear in: *Composite Structures*

Received Date: 8 November 2016

Revised Date: 22 February 2017

Accepted Date: 10 April 2017



Please cite this article as: Zhang, Y., Zhang, L., Zhang, J., Yin, X., Liu, C., Effects of z-pin's porosity on shear properties of 2D C/SiC z-pinned joint, *Composite Structures* (2017), doi: <http://dx.doi.org/10.1016/j.compstruct.2017.04.013>

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.

1 Effects of z-pin's porosity on shear properties of 2D C/SiC z-pinned joint

2 Yi Zhang; Litong Zhang; Jiaxin Zhang; Xiaowei Yin; Chidong Liu*

3 Science and Technology on Thermostructural Composite Materials Laboratory,
4 Northwestern Polytechnical University, West Youyi Rd., No. 127, Xi'an, Shaanxi
5 710072, PR China

6 Abstract

7 In this paper, 2D C/SiC z-pinned joint is prepared via chemical vapor infiltration.
8 Effects of z-pin's porosity on shear properties of z-pinned joint are investigated from
9 the failure mode and the shear damage mechanisms. The results show that the average
10 joint shear strength decreases asymptotically from 249.9 MPa to 97.2 MPa as the total
11 porosity of 2D C/SiC z-pin increases from 14.4% to 27.3%. For each porosity, the
12 joint shear strength is between the tensile strength and the in-plane shear strength of
13 2D C/SiC, which is rationalized by the rigid body sliding model of 2D C/SiC.
14 Because high porosity leads to large rotational deformation of transverse fibers, a
15 critical porosity about 17.7% is observed from shear-controlled failure to
16 bending-controlled failure. A cohesive fracture model is developed to build the
17 relation between the joint shear strength and the mechanical properties of 2D C/SiC.
18 Very good accuracy is obtained.

19 Keywords: A. Ceramic-matrix composites (CMCs); B. Mechanical properties; B.

*Corresponding author. E-mail address: liuchidong@nwpu.edu.cn (Chidong Liu)

Download English Version:

<https://daneshyari.com/en/article/4911963>

Download Persian Version:

<https://daneshyari.com/article/4911963>

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