

Accepted Manuscript

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PII: S0167-577X(17)31839-6
DOI: <https://doi.org/10.1016/j.matlet.2017.12.078>
Reference: MLBLUE 23576

To appear in: *Materials Letters*

Received Date: 19 April 2017
Revised Date: 3 December 2017
Accepted Date: 17 December 2017

Please cite this article as: Y. Xia, K. Shi, The microstructural characteristics and mechanical property of Al fiber-reinforced cordierite ceramics, *Materials Letters* (2017), doi: <https://doi.org/10.1016/j.matlet.2017.12.078>

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The microstructural characteristics and mechanical property of Al fiber-reinforced cordierite ceramics

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Abstract: Al fiber-reinforced cordierite was prepared by solid state reaction of clay, talc and alumina sintered at 1370°C in carbon embedded condition. The microstructures were observed via scanning electron microscope (SEM), three-point flexural strength was examined on a universal testing machine. The SEM microphotograph shows a weak-bonded interfacial phase AlN, which was attributed to the reaction between Al and N₂ at high temperature in carbon protection condition, was formed between cordierite matrix and Al fiber. It facilitates fiber debonding and fiber pullout during fracture test. Three-point flexural test indicates both fracture displacement and flexural strength of Al-reinforced cordierite are bigger than that of the monolithic cordierite. With increasing Al-fiber addition, the higher strength and longer displacement were found.

Keywords: Ceramics; Preparation; Interface; Microstructure; Mechanical Property

1. Introduction

Cordierite (2MgO·2Al₂O₃·5SiO₂) ceramics are excellent candidates in rapid high-low-temperature alternating environment due to its low thermal expansion with

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