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PII: S0025-5408(16)30961-8
DOI: http://dx.doi.org/doi:10.1016/j.materresbull.2017.03.046
Reference: MRB 9238

To appear in: *MRB*

Received date: 13-9-2016
Revised date: 5-3-2017
Accepted date: 23-3-2017

Please cite this article as: S. Wang, F. Zeng, Y. Li, Y. Gu, F. Zhang, X. Xiong, Oxidation Mechanism of SiC-Zirconia-Glass Ceramic Coated Carbon/Carbon Composites at 1123-1273K, *Materials Research Bulletin* (2017), http://dx.doi.org/10.1016/j.materresbull.2017.03.046

Oxidation Mechanism of SiC-Zirconia-Glass Ceramic Coated Carbon/Carbon Composites at 1123-1273K

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Abstract

A novel type of SiC-Zirconia-Glass coating for carbon/carbon(C/C) composites was designed and prepared by slurry method and their microstructure and oxidation behavior at temperatures of 1123K-1273K were investigated. The results show that the weight loss rate of samples was below 1.5% after oxidation of 70 hours and have excellent mechanical properties remaining after a 1123-1273K oxidation process. The relationship between the weight loss rate and oxidation time can be fitted to an exponential curve and the reaction activation energy of diffusion through the coating cracks was 16.68 kJ·mol^{-1}. It was found that the oxidation model of SiC-ZrO_2-Glass coated C/C composites was not exactly follow to Arrhenius's law during temperature of 1123-1273K and has characteristics of defective oxidation.

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