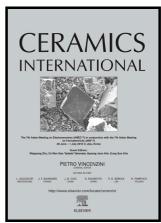
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Experiments and transient finite element simulation of γ -Y₂Si₂O₇/ B₂O₃-Al₂O₃-SiO₂ glass coating on porous Si₃N₄ substrate under thermal shock

Xingyu Fan, Hongjie Wang, Min Niu, Dahai Zhang, Jun Zhou, Jinpeng Fan



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ACCEPTED MANUSCRIPT

Experiments and transient finite element simulation of $\gamma\text{-}Y_2Si_2O_7/$ $B_2O_3\text{-}Al_2O_3\text{-}SiO_2 \ glass \ coating \ on \ porous \ Si_3N_4 \ substrate \ under \ thermal \ shock$

Xingyu Fan ^a, Hongjie Wang ^{a*}, Min Niu ^a, Dahai Zhang ^{b*}, Jun Zhou ^b, Jinpeng Fan ^b
^a State Key Laboratory for Mechanical Behavior of Materialas, Xi'an Jiaotong
University, Xi'an, Shannxi 710049, People's Republic of China

^b Aerospace Research Institute of Material & Processing Technology,

Beijing, 100076, People's Republic of China

*Corresponding author

Hongjie Wang. E-mail: hjwang@mail.xjtu.edu.cn; Fax: +86-029-82663453; Tel:

+86-029-82667942

Dahai Zhang. E-mail: yrlzdh@sohu.com

Abstract

A dense γ -Y₂Si₂O₇/B₂O₃-Al₂O₃-SiO₂ glass coating was fabricated by slurry spraying method on porous Si₃N₄ ceramic for water resistance. Thermal shock failure was recognized as one of the key failure modes for porous Si₃N₄ radome materials. In this paper, thermal shock resistance of the coated porous Si₃N₄ ceramics were investigated through rapid quenching thermal shock experiments and transient finite element analysis. Thermal shock resistance of the coating was tested at 700°C, 800°C, 900°C and 1000°C. Results showed that the cracks initiated within the coating after thermal

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