Title: New anti-ablation candidate for carbon/carbon composites: preparation, composition and ablation behavior of $Y_2Hf_2O_7$ coating under an oxyacetylene torch

Authors: Shengyue Gu, Shouyang Zhang, Fei Liu, Wei Li

PII: S0955-2219(18)30472-2
DOI: https://doi.org/10.1016/j.jeurceramsoc.2018.07.042
Reference: JECS 12010

To appear in: *Journal of the European Ceramic Society*

Received date: 5-2-2018
Revised date: 21-7-2018
Accepted date: 26-7-2018

Please cite this article as: Gu S, Zhang S, Liu F, Li W, New anti-ablation candidate for carbon/carbon composites: preparation, composition and ablation behavior of $Y_2Hf_2O_7$ coating under an oxyacetylene torch, *Journal of the European Ceramic Society* (2018), https://doi.org/10.1016/j.jeurceramsoc.2018.07.042

New anti-ablation candidate for carbon/carbon composites: preparation, composition and ablation behavior of $Y_2Hf_2O_7$ coating under an oxyacetylene torch

Shengyue Gu[a], *Shouyang Zhang*[a]*, *Fei Liu*[a,b], *Wei Li*[a]

[a] *State Key Laboratory of Solidification Processing, Northwestern Polytechnical University, Xi'an 710072, China*

[b] *College of Mechanical and Electrical Engineering, Xi'an Polytechnic University, Xi'an 710048, China*

*Corresponding author: Shouyang Zhang**

E-mail address: zhangshouyang@nwpu.edu.cn; zhangshouyang_npu@outlook.com

Abstract

$Y_2Hf_2O_7$ possesses low thermal conductivity and high melting point, which make it promising for a new anti-ablation material. For evaluating the thermal stability and the potential applications of $Y_2Hf_2O_7$ on anti-ablation protection of C/C composites, $Y_2Hf_2O_7$ ceramic powder was synthesized by solution combustion method and $Y_2Hf_2O_7$ coating was prepared on the surface of SiC coated C/C composites using SAPS. Results shown that the coating exhibits good ablation resistance under the heat flux of 2.4 MW/m^2 with the linear and mass ablation rates are 0.16 μm·s^{-1} and -0.028 mg·s^{-1}, respectively, after ablation for 40 s. With the prolonging of the ablation time, the increasing thermal