Jon Binner, J Material Sci Eng 2018, Volume 7
DOI: 10.4172/2169-0022-C5-103

6th International Conference and Exhibition on

MATERIALS SCIENCE AND CHEMISTRY

May 17-18, 2018 | Rome, Italy

Jon Binner

University of Birmingham, UK

Development of high and ultra-high temperature ceramic matrix composites

There is an increasing demand for advanced materials for aerospace and other applications, with temperature capability ranging from 1500 to well over 2000 and able to survive highly corrosive environments whilst subject to intense heat fluxes and mechanical stresses. The interaction of environmental conditions together with the requirement that dimensional stability is maintained makes the selection of suitable materials extremely challenging. This paper discusses the design, development, manufacture and testing of a new class of ceramic matrix composites based on either SiC or C fibre preforms and enriched with different ceramic powders as well as a matrix infiltrated by either microwave- or RF-heated chemical vapour infiltration (CVI). These composites will form suite of materials suitable for application in severe aerospace environments.

Recent Publications

1. Paul A, Rubio V, Binner J G P, Vaidhyanathan B, Heaton A C J and Brown P M (2017) Evaluation of the high temperature performance of UHTC composites. Int. J. Appl. Ceram. Tech. 14(3):344-353.
2. Paul A, Binner J G P, Vaidhyanathan B and Brown P M (2016) Heat flux mapping of oxyacetylene flames and their use to characterise Cf-HfB_2 composites. Adv. Appl. Ceram. 115(3):158-165.
3. Binner J G P, Vaidhyanathan B and Jaglin D (2013) Microwave heated chemical vapour infiltration of SiC powder impregnated SiC fibre preforms. Adv Appl Ceram. 112(4):235-241.

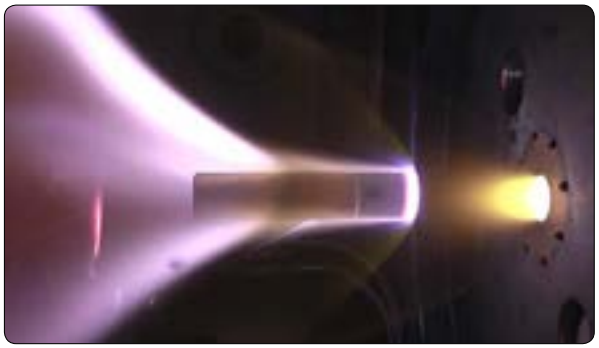

Figure 1: A Cfibre – HfB_2 powder – Cmatrix composite being arc-jet tested at ~2700°C

4. Paul A, Venugopal S, Binner J G P, Vaidhyanathan B, Heaton A C J and Brown P M (2013) UHTC-carbon fibre composites: Preparation, oxyacetylene torch testing and characterisation. J. Eur. Cer. Soc. 33:423-432.
5. Paul A, Jayaseelan D D, Venugopal S, Zapata Solvas E, Binner J, Vaidhyanathan B, Heaton A, Brown P and Lee W E (2012) UHTC composites for hypersonic applications. Am. Ceram. Soc. Bull. 91(1):22-29.

Biography

Jon Binner is the Deputy Head of the Engineering & Physical Sciences College, and Professor of Ceramic Science & Engineering in the School of Metallurgy and Materials, at the University of Birmingham. He has published about 220 research papers, as well as editing or contributing to 19 books, given around 60 keynote, plenary and invited talks at international conferences and holds 7 patents. He has won 128 research grants totalling about £16.3M, many have been international in nature. He is a Fellow of the American Ceramic Society (ACerS), the European Ceramic Society (ECerS), the Institute of Materials, Minerals & Mining (IOM3) and the Association for Microwave Power in Europe for Research and Education (Ampere). He was the President of the IOM3 from 2012-14 and is currently President-Elect of ECerS. The IOM3 awarded him the Holliday Prize in 1995, the Ivor Jenkins Medal in 2007 and the Verulam Medal & Prize in 2011.

j.binner@bham.ac.uk