Biomimetic GYbZ thermal barrier coatings against CMAS adhesion and wetting

Yiqian Guo[1], Wenting He[1], Lei Guo[2], Hongbo Guo[1] (The name of the presenter should be bolded and underlined)

[1]*Beihang University, Xueyuan Road 37, 100191 Beijing, China*

[2]*Tianjin University, Weijin Road 92, 300072 Tianjin, China*

Presenter's e-mail address: guoyiqian@buaa.edu.cn

Abstract The silicate deposits from volcanic ash, desert sand and dust melt at high temperature and adhere to the hot components of turbine engines; whereupon attack the thermal barrier coatings (TBCs), eventually leading to the premature failure of the TBCs, thereby endangering operating safety. The challenge for the high-temperature protective coatings is how to improve CMAS resistance of thermal barrier coatings. Recently, a 10 mol% Yb_2O_3-doped $Gd_2Zr_2O_7$ (GYbZ) TBC has been developed as one of the most promising candidates of advanced TBC materials. In this paper, we attempt to construct biomimetic microstructure on GYbZ coating surface, providing theoretical and technical support for the development of ultra-high temperature thermal barrier coatings with excellent silicate resistance for the next generation aero-engine.

Keywords TBCs, GYbZ, biomimetic, CMAS

Reference

[1] Y.Q. Guo, W.J. Song, L. Guo, X.X. Li, W.T. He, X.D. Yan, D.B. Dingwell, H.B. Guo, Molten-volcanic-ash-phobic thermal barrier coating based on biomimetic structure, Adv. Sci. (2023) 2205156.

[2] Y.Q. Guo, L. Guo, X.X. Li, C.Y. Jiang, L.L. Wei, X.Y. Zhu, D.R. Liu, W.J. Song, D.B. Dingwell, H.B. Guo, Ultrafast laser reconstructed PS-PVD thermal barrier coatings with superior silicophobic triple-scale micro/nano structure, Mater. Des. 111846 (2023) 228.