

Keynote Lecture

Title	Associate Professor	First Name	Guang-Rong	Last Name	Li
Affiliation		Xi'an Jiaotong University			
Presentation Title		Structure designs for durable thermal barrier coatings in multi-scales			
Biography		<p>He is an associate professor in Xi'an Jiaotong University. His research focus on structure designs of plasma sprayed thermal protective coatings for long life span and high thermal insulation. Supported by the NSFC and other funds, he has published 40 more papers (including 4 ESI highly cited papers) and held 20 more issued patents.</p> <p>He has gave 10 more invited talks in related high level conferences (including ATSC 2024 et al.). He is a member of the Young Elite Scientists Sponsorship Program by CAST. In 2019, he won the First Prize in Science and Technology of Shaanxi Higher Education Institutions.</p>			
Abstract		<p>Long life span is a basic support for thermal insulation function of thermal barrier coatings (TBCs). However, it is difficult to simultaneously achieve these two performances in conventional lamellar or columnar TBCs, which often have to sacrifice one performance due to limit of the mono-featured structure. In this work, a bimodal-structured coating with columnar/lamellar trans-scale features was designed to meet multiple requirements. The micro-lamellar structure was deposited to effectively prevent heat flux, and the macro-columnar structure was tailored to tolerate strain. Firstly, a method to prepare and tailor the bimodal-structured coating was proposed. From the view of thermal insulation, thermal conductivity of the bimodal-structured coating was comparable to the typical lamellar structure. From the view of durability, thermal cyclic life span of the bimodal-structured coating can be extended significantly compared to the typical lamellar structure. Subsequently, the</p>			



macro-columnar structures were optimized based on tailoring the distance between neighboring vertical cracks, L , and coating thickness, h , and a finite element model was developed to investigate the optimization of the geometry of such coatings. Overall, the bimodal-structured coating is expected to co-enhance thermal insulation and thermal cyclic performances, which represents a fundamental step toward the development of advanced TBCs for future applications.