

Robust Ceramics with Advanced and Predictable Properties for Extreme Environment

Monday, March 16, 11am-12pm; Dean's Conference Room E-203E

Abstract: The emerging technological developments of the current world has created opportunities and challenges to develop material systems with a wide range of desired properties. In particular, material innovation along with developments in processing and manufacturing technologies are necessary to exploit the potential of ceramics for extreme environment applications. Ceramics typically fail catastrophically by unobstructed crack propagation. An attractive way to overcome this, and optimize the strength and toughness of structural ceramics, is to develop controlled architectures by combining our learning from traditional ceramics processing/sintering practices and the recent advancements in ceramic additive manufacturing. Processing strategies to achieve target microstructures, characterization and testing are all equally important to understand and validate the material performance. In this talk, I will provide a brief overview of my research experience related to this topic, with specific examples on ceramics processing for targeted applications. Other topics include studies on phase evolution, microstructural development in multiphase ceramic-based systems and structural characterization to study processing-structure-property relationships. Through this talk, I hope to illustrate how we can combine the fundamentals of processing, characterization and mechanistic studies to help develop an informed approach in designing and developing advanced ceramic composites, that can display cumulative effects to overcome the drawbacks of respective individual materials and attain higher performance attributes.



Dr. Priyatham Tumurugoti

BIO: Dr. Priyatham Tumurugoti is a post-doctoral researcher in the School of Materials Engineering at Purdue University, West Lafayette, IN. He received his Bachelor's degree in Metallurgical and Materials Engineering from Indian Institute of Technology Madras (India) in 2009, M.S and Ph.D both in Materials Science and Engineering from Missouri University of Science and Technology, MO and Alfred University, NY respectively. His current research focuses on processing and development of ceramics and ceramic composites for applications in extreme environments. During his Ph.D, he worked on synthesis and structural characterization of phase-pure and multiphase ceramics for nuclear waste immobilization. His post-doctoral work at Alfred University focused on processing, mechanical characterization and fractography of silicon nitride-based ceramics. At Purdue University, he works on synthesis of a variety of ceramic-metal composites by reactive meltinfiltration, and develop ceramics processing protocols such as tape-casting to demonstrate scalability of material fabrication. In summary, Dr. Tumurugoti has worked on various processing and consolidation techniques of oxide and non-oxide ceramics for energy and environment applications, with special focus on microstructural and mechanical characterization.

Faculty Contact: Dr. Wenwu Xu Professor, Chair of Search Sub-Committee Email: wenwu.xu@sdsu.edu

Department of Mechanical Engineering San Diego State University 5500 Campanile Drive San Diego, CA 92182