

## Keynote Lecture

Title	Prof.	First Name	Hua	Last Name	Li
<b>Affiliation</b>			Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences		
<b>Presentation Title</b>			Solution precursor plasma sprayed Ce-doped Bi <sub>2</sub> O <sub>3</sub> coating with tuned bandgap for enhanced visible-light photocatalytic activities		
<b>Biography</b>			<p>Dr. Hua Li is a professor of Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, China. Dr. Li earned his B.Eng. and M.Eng. from Xi'an Jiaotong University China in 1994 and 1997 respectively. He then joined Nanyang Technological University Singapore for his PhD study on biomedical coatings and got his PhD degree in 2002.</p> <p>Afterwards, Dr. Li continued his research in thermal spray as Research Fellow and later SMF Research Fellow in Nanyang Technological University. In 2006, he joined Brookhaven National Laboratory in New York working on structures of biomolecules. In 2010, Dr. Li returned back China and joined Chinese Academy of Sciences as a full professor to setup his advanced coatings &amp; additive manufacturing laboratory. Dr. Li's laboratory is devoted to deep commitment to both fundamental and applied research on new coating materials, surface chemistry and physics, and design and thermal/cold spray construction of novel functional coatings.</p>		
<b>Abstract</b>			<p>Thermal spray has shown great promises in fabricating photocatalytic nanostructured coatings for a variety of functional applications. Developing novel photocatalytic materials and appropriate coating techniques for tunable nanostructures yet remains challenging. This presentation will briefly introduce our efforts made in recent years on thermal sprayed photocatalytic coatings. In particular, solution precursor plasma sprayed (SPPS) Ce-doped Bi<sub>2</sub>O<sub>3</sub> coatings will be addressed. Bi<sub>2</sub>O<sub>3</sub> is a promising yet limited photocatalyst due to its narrow light-response range and rapid charge carrier recombination. Precursor solutions with varying Ce/Bi ratios were deposited onto</p>		



o 316L stainless steel substrates using an atmospheric plasma spray system with a solution feeder. Comprehensive characterization evidenced

successful Ce incorporation into  $\text{Bi}_2\text{O}_3$  lattice, reducing the band gap and extending light absorption into the visible region. The coating with 3% Ce/Bi ratio exhibited exceptional performance, achieving 91.82% methyl orange degradation after 6 hours of visible light irradiation. This enhancement is attributed to effective bandgap narrowing and oxygen vacancy regulation via Ce doping, which significantly improved visible light absorption and charge carrier separation/transport. The one-step SPPS processing route would shed light on developing high-performance visible-light-driven photocatalytic coatings for environmental purification, biomedical and life health applications.