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Innovation in nanostructured ceramic coatings for structural, functional and biomedical applications

This presentation gives an overview of nanostructured ceramic films and coatings that have been developed using eco-friendly, non-vacuum and scalable aerosol assisted chemical vapour deposition (AACVD) processes with well controlled structure and composition at molecular level. The fundamental aspects of AACVD including process principles, deposition mechanism, reaction chemistry, kinetics, and mass transport phenomena will be presented. The relationships of the process/structure/property of the coatings fabricated by AACVD based methods will be described. The scientific and technological significant of these methods will be discussed and reviewed. AACVD is a variant of the CVD process. It has the capability to deposit high purity nanostructured thin and thick ceramic coatings at low processing temperatures. The potential applications of such cost-effective and high performance ceramic coatings for structural, functional and biomedical fields will be highlighted, covering ceramic coatings for extreme environments, tribology, energy generation and storage, as well as coated medical implants and devices. The technical viability and the potential of the AACVD process to be scaled up or large area and large scale production will also be presented.

Biography

Kwang-Leong Choy (DPhil, DSc, FIMMM, FISC) joined University College London in 2014 to take up the role of Director of UCL Institute for Materials Discovery. She has extensive experience in materials creation, discovery and exploitation of eco-friendly, cost-effective and sustainable thin films and nanomaterials processing technologies, especially for structural, functional and biomedical applications. She has published over 200 papers, including 2 books and 20 patents. She obtained her DPhil in Materials Science from the University of Oxford, where she was awarded the Hetherington Prize and Oxford Metallurgical Society Award. She was a Violette and Samuel Glasstone Research Fellow at Oxford before joining Imperial College in 1994. She pioneered the innovative Electrostatic Spray Assisted Vapour Deposition (ESAVD) based methods, which have led to the Grunfeld Medal Prize by Institute of Materials (UK). She was awarded a Visiting Professorship (2001/03) by the Swedish Engineering Research Council at the University of Uppsala, Visiting Professorship by Chinese Academy of Sciences (2011/2013). She has been awarded multimillion pounds research from EPSRC, HEFCE, the Royal Society, EU-FP 6 &7, Marie Curie, TSB, Regional Development Agency (RDA) and many companies.

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