

Electro-catalysis for Fuel Cells and Advanced Oxidation Technologies

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Direct Alcohol Fuel Cells (DAFCs) as an emerging new clean energy technology are very attractive as power sources for mobile and portable applications. Nonetheless, on the basic research side, a significant challenge is to gain a fundamental understanding of fuel cell catalyst structures and their corresponding catalytic reaction mechanisms. The fundamental studies can provide a platform not only for understanding catalyst performance but also for exploring the structure-activity relationship at atomic and molecular level; and ultimately for rationally designing new nanocatalysts. On application side, innovation in polymer electrolyte materials, single cell and stack design is crucial for achieving high power density and developing efficient fuel cell systems as a versatile clean energy technology.

Recent advances on both the fundamental nanomaterials and electrocatalysis studies by combined in-situ electrochemical FTIR spectroscopy and Density Functional Theory calculations, as well as fit-for-purpose fuel cell system development, novel electrode structure, new polymer electrolyte, innovative single cell and stack design and fabrication will be reported in the first part of the talk.

Second part of the talk is on recent advances on electro-catalysis for green and energy-efficient ozone production via water splitting, for water/wastewater treatment and more general advanced oxidation technologies.



Professor Wen-Feng Lin, FRSC, has particular expertise in physical chemistry, electrochemistry and electrochemical engineering. The primary themes of his research are related to energy, environment and water. He collaborates internationally and has led a significant number of externally funded projects, ranging from fundamental understanding of electro-catalysis at atomic and molecular levels to applied R&D in energy materials, fuel cells, batteries, and ozone generation from water for water treatment and advanced oxidation technologies; resulting in an output of over 160 publications, 6 patents and contributions to 2 spin-outs.

After obtaining his BSc, MSc and PhD (under supervision of Profs. Z. W. Tian, S. G. Sun & Z. Q. Tian) from Xiamen University, he was a Lecturer then an Associate Professor at Xiamen University, a Senior Visiting Scholar at Hong Kong University and Case Western Reserve University; held two Research Fellowships awarded by the prestigious Humboldt-Foundation and Max-Planck-Society working with Nobel Laureate Prof. Ertl in the Fritz-Haber-Institute in Berlin; was a Senior Research Fellow and Founding Director of two spin-outs at Newcastle University, a Reader/Research Professor at Queen's University Belfast; has been a full Professor of Chemical Engineering at Loughborough University since 2015.