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Prof. Shi-Gang Sun obtained his Bachelor of Science from Xiamen University, China, in 1982, Doctorat d'Etat (Docteur ès Sciences Physiques) from the Université Pierre et Marie Curie (Paris VI), France, in 1986. After one-year post-doctoral research in the Laboratoire d'Electrochimie Interfaciale du CNRS, France, he returned to China by the end of 1987, and served as associate professor and later full professor in 1991 at the Department of Chemistry of Xiamen University till now. The main research interests of Prof. Sun include Electrocatalysis, Electrochemical Surface Science, Spectro-electrochemistry, Nanomaterials and Chemical power sources. Prof. Sun has been elected Academician of Chinese Academy of Sciences in 2015, fellow of International Society of Electrochemistry (ISE) in 2007, and fellow of Royal Society of Chemistry (RSC) in 2005. He has been awarded the "Brian Conway Prize" from International Society of Electrochemistry (ISE), "Distinguished Contribution Award" from the Chinese Society of Electrochemistry, "Le prix Franco-Chinois 2014-2015" jointly from Société Chimique de France (SCF) and Chinese Chemical Society (CCS), and the State Natural Science Award (2nd Degree) of China. He is now editorial board member of Journal of Electroanalytical Chemistry, Functional Materials Letters, ACS Energy Letters, Electrochemical Energy Review, National Science Review and Journal of Solid State Electrochemistry, serving as associate editor to Electrochimica Acta, Spectral Analysis and Spectroscopy, Chinese Journal of Chemical Education, Acta Chimica Sinica, and editor-in-chief of the Journal of Electrochemistry.

Electrochemical Energy Conversion and Storage: Structure Design of Electrode and In-Situ Spectroscopic Studies

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The property of electrode in electrochemical energy conversion (Fuel cells) and storage (lithium batteries) depends strongly on the structure. On the one hand, the platinum group metals (PGMs) and Pt-based catalysts are of vital importance for fuel (organic molecules, hydrogen) oxidation to promote the efficiency of energy conversion; On the other hand, the performances of electrode materials are crucial for developing lithium ion batteries (LIBs) with high energy, high power and safety. We have focused in recent years on the structure design and controlled synthesis of both electrocatalysts for DOFCs and electrode materials for LIBs. In order to gain deep understanding on the surface/bulk processes and reaction mechanism involved in electrochemical energy conversion and storage, we have developed in situ spectroscopy methods including Sum Frequency Generation (EC-SFG), Nuclear Magnet Resonance (EC-NMR), X-ray diffraction (EC-XRD), Online electrochemical Mass Spectroscopy (OEMS), Transmission Electron Microscopy (EC-TEM), Electrochemistry-X Ray Photoelectron Spectroscopy (EC-XPS) and Fourier Transform Infrared Spectroscopy (In-situ FTIRs). This presentation will briefly introduce the key progresses of above topics.

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