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2021 WORLD FUEL CELL CONFERENCE

AUGUST 17-20, 2021 | WATERLOO, CANADA

Name	Xueliang Andy Sun	
Affiliation	University of Western Ontario, Canada	
Invited Plenary Lecture		
Presentation Title	Single Atom Electrocatalysts for PEM Fuel Cells: Opportunity, Challenge and Progress	
Abstract (Approximately 200 words)	<p>Fuel cells are electrochemical devices that convert the chemical energy of a fuel directly to electrical power. However, there are still challenges ahead which are hindering the market implementation of PEMFC technology, mainly high cost of materials and the durability during fuel cell life-time operation. The high cost is primarily associated with precious metal catalysts (Pt or Pt alloys). It is well accepted that the catalytic efficiency and selectivity of catalysts are not only size dependent, but also dependent on shape and composition. Key challenges to be overcome include the ability to accurately control synthesis of the shape and composition of Pt-based nanostructures (e.g. from nano size down to Pt single atom or clusters). The noble atom catalysts have attracted rapidly increasing attention due to their unique catalytic properties and maximized utilization for low-cost. This invited talk will focus on Pt-based electrocatalysts from nanoparticles to single atoms, with an overview of the development of single atom catalysts in fuel cells. In particular, the collaborative work with Ballard Power Systems on atomic layer deposition technique (ALD) will be presented for high density of isolated single atom catalysts and dimers, with emphasis of understanding of catalytic active sites and insights into the design of high performance of novel catalytic systems will be provided along with future perspectives.</p>	
Biographical Sketch (Approximately 200 words)	<p>Dr. Xueliang (Andy) Sun is a Full Professor and senior Canada Research Chair (Tier I) at the University of Western Ontario, Canada. Dr. Sun is a Fellow of Royal Society of Canada and Fellow of the Canadian Academy of Engineering. Dr. Sun received his Ph.D degree in Materials Chemistry at the University of Manchester, UK, in 1999. Dr. Sun's research is focused on advanced materials for energy conversion and storage including fuel cells and Li batteries. Dr. Sun was named as one of "Highly Cited Researchers" in 2018-2020. Dr. Sun is an author and co-author of over 500 refereed-journals (e.g. Nature Energy, Nature Communications, Advanced Materials, J. Am. Chem. Soc., Angew. Chem., Nano Letter, Energy & Environmental Science) with citations of over 33,000 times and H-index of 92. He edited 4 books and published 18 book chapters as well as filed 24 patents. Dr. Sun received various awards such as Award for Research Excellence in Materials Chemistry Winner from Canada Chemistry Society (2018) and University Hellmuth Prize for Achievement in Research (2019). Dr. Sun is a vice Chairman of the International Academy of Electrochemical Energy Science (IAOEEES). He also serves as an Editor-in-Chief of "Electrochemical Energy Review" under Spring-Nature.</p>	