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2021 WORLD FUEL CELL CONFERENCE

AUGUST 17-20, 2021 | WATERLOO, CANADA

Name	Zhongwei Chen	
Affiliation	University of Waterloo	
Invited Plenary Lecture		
Presentation Title	Advanced Platinum and Non-Platinum Catalysts for PEM Fuel Cells	
Abstract (Approximately 200 words)	<p>Polymer electrolyte membrane fuel cells are promising for powering vehicles, residential applications and portable electronic devices, their widespread commercialization hinges, however, on further reduction in materials cost, improvement of durability and increase in overall efficiency. Their key component includes the anode and cathode catalyst layers. The longstanding goal for the catalysts is low cost, high catalytic activity for oxygen reduction reaction (ORR) and viable durability. In this presentation, our approaches to address the main challenges of the catalysts will be outlined by focusing on the following two topics: Pt-based catalysts and non-precious metal catalysts (NPMC). For the former, (i) unique 1D-nanostructured Pt and Pt-based alloy catalysts, (ii) heteroatom-doped nanocarbon supports and (iii) non-carbon nanostructured support materials have been developed and demonstrated to dramatically enhance ORR activity and stability. For the latter, significant progress has been made in the following aspects: (i) novel single-atom catalyst design and synthesis, (ii) active site identification and dynamic structural evolution, (iii) electronic/geometric structure regulation, (iv) catalyst layer optimization and electrode diagnosis. Fundamental understanding on the catalytic mechanism has been gained, and huge promise of the as-developed NPMCs has been demonstrated to replace Pt/C in practical fuel cells. These achievements will push this field one step ahead.</p>	
Biographical Sketch (Approximately 200 words)	<p>Dr. Zhongwei Chen is Canada Research Chair (CRC-Tier 1) Professor in Advanced Materials for Clean Energy at the University of Waterloo, Fellow of the Royal Society of Canada (FRSC), Fellow of the Canadian Academy of Engineering (FCAE), Director of Waterloo Center for Electrochemical Energy, Associate Editor of ACS Applied Materials & Interfaces, and Vice President of International Academy of Electrochemical Energy Science. His research interests are in the development of advanced energy materials and electrodes for fuel cells, metal-air batteries, and lithium-ion batteries. He has published 3 books, 11 book chapters and more than 350 peer reviewed journal articles with over 30,000 citations with an H-index of 87 (GoogleScholar). He is also listed as inventor for over 60 US/international patents, with several licensed to companies internationally. Dr. Chen has trained over 100 highly qualified personnel. He was the recipient of the 2016 E.W.R Steacie Memorial Fellowship, the member of the RSC's College of New Scholars, Artists and Scientists in 2016, FCAE in 2017, the Rutherford memorial medal from RSC in 2017, which followed upon several other prestigious honors, including the Ontario Early Researcher Award, an NSERC Discovery Supplement Award, the Distinguished Performance and Research Award. In 2018, 2019 and 2020, Dr. Chen was ranked as the Global Highly Cited Researchers by Clarivate Analytics. He was elected as FRSC in 2019.</p>	