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2021 WORLD FUEL CELL CONFERENCE

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Name	Samaneh Shahgaldi	
Affiliation	University of Quebec at Trois-Rivieres	
Invited Keynote Lecture		
Presentation Title	Impact of Ionomer Ratio, Type and Design on Fuel Cell Performance and Durability under Different Operational Conditions	
Abstract (Approximately 200 words)	Proton exchange membrane fuel cells offer a broad range of advantages for the environment and energy security. However, durability and cost are the two main challenges for mass production and commercialization. These two interrelated issues are greatly impacted by various parameters, mainly associated with the catalyst layer which is the main component of membrane electrode assembly. The state-of-the-art catalyst layers are made of supported Pt nanoparticles and perfluorosulfonic acid ionomers. Cost reduction has been focused on the reduction of catalyst loading which is often accompanied with a reduction in durability. In this talk, we take a holistic look at the impact of the ionomer used in catalyst layers on fuel cell performance and durability, as the ionomer affects the ionic conductivity, catalyst utilization, mass transport, and immobilization of catalyst particles. Different ionomer types, ratios and gradient designs are applied in the catalyst layers and their fuel cell performances will be discussed in detail under different operational conditions. In addition, we provide an effective insight into the degradation of catalyst layer with different platinum loadings made with various types of ionomer by investigating the morphological and microstructural characteristics under freeze-thaw cycles. This talk provides direction on the best ionomer selection based on the type of catalysts and operational conditions.	
Biographical Sketch (Approximately 200 words)	Samaneh Shahgaldi is an Associate Professor and Canada Research Chair Tier II at the Chemistry, Bio-Chemistry and Physics department at the University of Quebec à Trois-Rivières. She obtained her Ph.D in Chemical engineering at 2012 and worked as a research associate at Fuel Cell and Green Energy Lab at University of Waterloo for 4 years. She was also a Senior Research Scientist at Cummins/ Hydrogenics dealing with different PEM Fuel Cell and PEM Water electrolyzer projects. Dr. Shahgaldi is an award-winning researcher with unique interdisciplinary expertise in nanomaterials, organic chemistry, and chemical engineering. She has made foundational contributions to research in synthesis of novel nanomaterials and engineer the surface properties for fuel cells and hydrogen storage applications. She is also directed R&D projects in the development of next-generation membrane electrode assembly (MEA) and components.	



Fuel Cell Division



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