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# 2021 WORLD FUEL CELL CONFERENCE

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Affiliation	Fraunhofer Institute for Solar Energy Systems ISE, Germany	
<h2 style="color: red;">Invited Keynote Lecture</h2>		
Presentation Title	<b>Catalyst coated membranes – their structure, their performance and their durability</b>	
Abstract (Approximately 200 words)	<p>Further development of polymer electrolyte membrane (PEM) fuel cells and their ultimate commercialization rely heavily on the systematic development of its components to meet stability and cost targets. This is especially true for the catalyst coated membrane (CCM) where to-date structuring of its components has led to many breakthroughs. The CCM is the heart of the cell, where the half-cell reactions occur and the byproducts are produced. The various transport phenomena simultaneously taking place in this assembly are complex in nature, resulting in most of the losses in performance. Material design plays an important role in reducing these losses and in prolonging the lifetime of the cell and its components. In this talk, we touch on the design and production of the catalyst coated membrane via screen printing. We will give an overview of our activities on production of catalyst layers with the focus of the talk on the beginning and end of life performance. Effect of ink ingredients, especially those of the cathode catalyst layer, will be discussed in detail. Finally, we look at how machine learning can be used as a tool for the advancement of electrode design and its production.</p>	
Biographical Sketch (Approximately 200 words)	<p>Dr. Nada Zamel is a senior scientist at Fraunhofer Institute for Solar Energy Systems, ISE, in Freiburg, Germany. Her research interests are focused on various topics pertaining to material development and cell characterization of PEM fuel cells. To-date, the projects in which she has been involved vary from life cycle analysis, to investigation of the effect of air and hydrogen contamination on PEM fuel cells, to analyzing the effects of various stressors on the lifetime of PEM fuel cells and to the production of catalyst coated membranes. She is a proud University of Waterloo graduate, having obtained her bachelors, masters and doctoral degrees from there in 2005, 2007 and 2011, respectively.</p>	