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2021 WORLD FUEL CELL CONFERENCE

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Name	Simon Thiele	
Affiliation	Jülich Research Center and Friedrich-Alexander-Universität Erlangen-Nürnberg	
<h2 style="color: red;">Invited Keynote Lecture</h2>		
Presentation Title	Novel concepts for membrane electrode assemblies in fuel cells and water electrolyzers	
Abstract (Approximately 200 words)	<p>Solid polymer electrolyte membranes are one of the most important electrolyte concepts for both hydrogen fuel cells and water electrolyzers. Here, the so far most successful electrolyte membrane type are acidic membranes based on perfluorosulfonic acid with trade names such as Nafion or Aquivion. However, acidic polymer types make the use of noble metals in both fuel cells and water electrolyzers necessary, as the acidic environment causes fast degradation of non-noble metals. Recently anion exchange membrane (AEM) polymers are applied for both water electrolyzers and fuel cells. These materials in principle make it possible to use non-noble metals such as nickel as catalysts, which is less costly. In AEM water electrolysis it is also possible to use other materials than titanium as porous transport electrode material which again could significantly decrease cost. However, ionic conduction in alkaline is intrinsically worse than acidic conduction and also some electrode reactions such as the hydrogen oxidation are a problem under alkaline conditions. Very recently also bipolar systems which contain alkaline and acidic parts in the membrane electrode assemblies are investigated aiming on taking nothing but the best from the acidic and the alkaline world. In this lecture we give an overview and a critical discussion about recent literature, challenges and opportunities on the novel alkaline and bipolar solid electrolyte membrane concepts for fuel cells and water electrolyzers.</p>	
Biographical Sketch (Approximately 200 words)	<p>Prof. Dr.-Ing. Simon Thiele studied physics at the University of Freiburg. In 2009 he started a PhD on the tomographic reconstruction of catalyst layers for proton exchange membrane fuel cells at the Institute of Microsystems Technology of the University of Freiburg which he completed in 2013. From 2011 until 2017 he was group leader of the junior research group 'porous media' at the same institute. Since 2018 he is leader of the Electrocatalytic Interface Engineering research department at the Helmholtz Institute Erlangen-Nürnberg for Renewable Energy consisting of more than 30 PhD students and postdocs in three teams. Also since 2018 he is a professor at the Department of Chemical and Biological Engineering at the technical faculty of the Friedrich-Alexander-University Erlangen-Nürnberg. His research focuses on novel concepts for electrochemical conversion devices such as fuel cells or electrolyzers.</p>	