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## Numerical Simulation Approaches for Understanding Transports Behavior inside PEM Water Electrolyzer

Sirivatch Shimpalee\*

Ph.D., Hydrogen and Fuel Cell Center, University of South Carolina, USA

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**Abstract** In this presentation, numerical simulation techniques using in PEM Water Electrolyzer (WE) will be presented including conventional computational fluid dynamics and the meshless Lattice Boltzmann method (LBM) which is an alternative advanced modeling technique. This approach can be applied to existing models to visualize the transports inside the structure of microscale geometries, such as: a porous transport layer (PTL), micro porous layer (MPL), and catalyst layer (CL). The study where the goal was to use these numerical approaches and directly predict the transports behavior across the length scale (macro-, meso-, and micro-scales). The achievement of this work can enhance the potential capability of a model-based investigation of transport physics inside PEMWE to find solution of designs and operational conditions especially for transport applications.

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\*Corresponding Author's E-mail: SHIMPALE@cec.sc.edu