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PROTON EXCHANGE MEMBRANE FUEL CELL MODELLING FOR AUTOMOTIVE APPLICATIONS

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With the introduction of progressively more stringent emissions regulation, decarbonization targets, and energy resource constraints, hydrogen fuel cell vehicles have attracted interest from vehicle manufacturers, governments, and consumers. This paper describes computational modelling of a proton exchange membrane fuel cell for use in a fuel cell electric vehicle. Predicting fuel cell performance allows for selection of fuel cell system components to maximize efficiency in automotive applications. This paper reviews EU and Global Technical Regulation for hydrogen powered vehicles, and includes a description of commercially available fuel cell stacks and systems.



Recent Publications

1. A Fly and R H Thring (2016) A comparison of evaporative and liquid cooling methods for fuel. cell vehicles. *International Journal of Hydrogen Energy* 41(32):14217-14229.

2. Guangsheng Zhang and Satish G Kandlikar (2012) A critical review of cooling techniques in proton exchange membrane fuel cell stacks *International Journal of Hydrogen Energy* 37(3):2412-2429.
3. Ulrich Soupremanien et al. (2012) Tools for designing the cooling system of a proton exchange membrane fuel cell. *Applied Thermal Engineering* 40:161-173.
4. M. Gandiglio et al. (2013) Design and optimization of a proton exchange membrane fuel cell CHP system for residential use. *Energy and Buildings* 69:381–393.
5. Tabbi Wilberforce et al. (2017) Developments of electric cars and fuel cell hydrogen electric cars. *International Journal of Hydrogen Energy* 42:25695-25734.

Biography

Jonathan Amirmadhi is an Automotive Engineer with a passion for clean personal transport and smart mobility. The challenge of meeting rising demands for efficient mobility within limited physical infrastructure capacity is complex, and will require multiple innovations, bringing together different modes of transport, communication networks, personal devices, and digital and physical infrastructure. Zero emission vehicles will provide an important cornerstone in the new model of urban mobility, with hydrogen fuel cell electric vehicles showing great promise.

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