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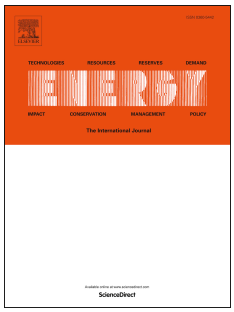

Design of an innovative distributor to improve flow uniformity using cylindrical obstacles in header of a fuel cell

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PII: S0360-5442(18)30595-4

DOI: 10.1016/j.energy.2018.04.005

Reference: EGY 12644

To appear in: *Energy*

Received Date: 19 December 2017

Revised Date: 31 March 2018

Accepted Date: 2 April 2018

Please cite this article as: Dabiri S, Hashemi M, Rahimi M, Bahiraei M, Khodabandeh E, Design of an innovative distributor to improve flow uniformity using cylindrical obstacles in header of a fuel cell, *Energy* (2018), doi: 10.1016/j.energy.2018.04.005.

Design of an innovative distributor to improve flow uniformity using cylindrical obstacles in header of a fuel cell

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Abstract

Since the greenhouse gas effect results in global warming, many attempts are made for substitution of renewable resources. In this regard, fuel cells are employed as important devices in the clean energy applications. Therefore, it is essential to implement efficient techniques to enhance the efficiency of fuel cells. In a parallel channel fuel cell, the efficiency of the device increases by passing the reactants through the reacting channels uniformly. As a result, the present research attempts to design a new distributor capable to be utilized in proton exchange membrane fuel cells, while embedding small cylindrical obstacles to improve uniformity of the flow distribution among the channels. The trial-and-error method is utilized to design the two-dimensional model with a specific uniformity level. Subsequently, the distributor scheme is modeled three-dimensionally integrated to the channels and collector. The modeled geometry is