

Development of a robust and efficient biogas processor for hydrogen production. Part 1: modelling and simulation

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Publication date

2017/9/7

Journal

International Journal of Hydrogen Energy

Volume

42

Issue

36

Pages

22841-22855

Publisher

Pergamon

Description

The present work deals with the modelling and simulation of a biogas Demo-processor for green hydrogen production via Autothermal reforming (ATR) process aimed at covering a wide span of potential applications, from fuel cells feed up to the production of pure hydrogen. The biogas ATR unit is composed of a structured catalyst support close coupled to a wall-flow filter that retain soot particles that can be formed during the ATR reaction. Modelling and simulation (CFD and FEM) were carried out to select the innovative catalyst support with promising results for the fuel processor. 3D digital sample reconstruction was performed for the selection of the appropriate porous structures commercially available for the soot filtration and furthermore, 2D CFD analysis was also used to examine flow uniformity issues due to soot trap integration downstream to the ATR. Moreover, the inherent flexibility of the model performed ...