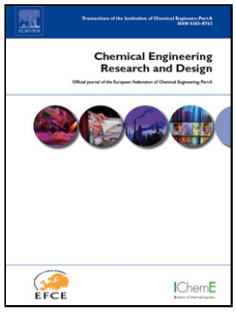

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PII: S0263-8762(18)30172-2
DOI: https://doi.org/10.1016/j.cherd.2018.03.045
Reference: CHERD 3115

To appear in:

Received date: 24-2-2017
Revised date: 26-3-2018
Accepted date: 27-3-2018

Please cite this article as: Saw, Shuey Z., Nandong, Jobrun, Ghosh, Ujjal K., Optimization of Steady-State and Dynamic Performances of Water-Gas Shift Reaction in Membrane Reactor.Chemical Engineering Research and Design https://doi.org/10.1016/j.cherd.2018.03.045

Optimization of Steady-State and Dynamic Performances of Water-Gas Shift Reaction in Membrane Reactor

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Highlights

- Pd/alloy catalytic multi-tubular reactor for water-gas shift reaction
- 1-D heterogeneous reactor model is validated using literature data
- Economic and controllability criteria are simultaneously optimized
- MCMC simulation to predict future hydrogen and electricity prices
- Membrane reactor is a viable option at the industrial-scale

Abstract

Membrane rector technology has been increasingly recognized as a promising solution to produce high-purity hydrogen and to support future realization of hydrogen economy. Although some of the economic evaluations have shown that the inclusion of membrane reactor into an existing IGCC plant may be a viable option, it remains to be answered whether the added system can be easily controlled or not. This paper presents a feasibility study of four pre-defined