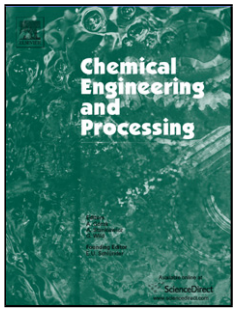

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A comprehensive model of a fluidized bed membrane reactor for small-scale hydrogen production

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Graphical_abstract

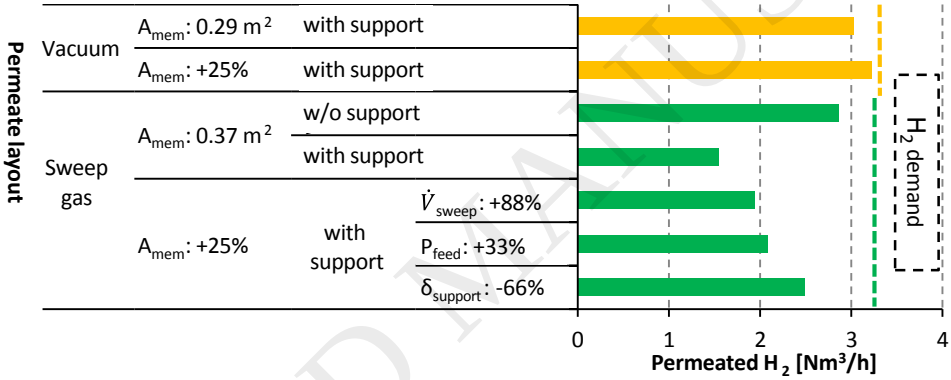

Figure 1 Comparison of permeated hydrogen between the ideal (dotted line) and the phenomenological (bars) model for different configurations of the membrane reactor (permeate layout) for a 5 kW_{el} m-CHP system.

Highlights

- A Fluidized bed membrane reactor for small-scale hydrogen production is simulated
- Ideal model and phenomenological two-phase model are compared
- Ideal model overestimates the hydrogen output by 10% with vacuum at permeate side
- Ideal model overestimates the hydrogen output by 50% with sweep gas at permeate side

Abstract

Membrane reactors, combining production and separation of pure hydrogen in one vessel, outperform conventional fuel processors for small-scale hydrogen production. Among different membrane reactor concepts,