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Review Article

Recent trends in the development of reactor systems for hydrogen production via methanol steam reforming

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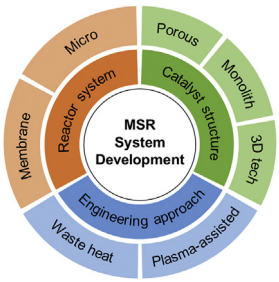
HIGHLIGHTS

- Development trends and technologies for representative techniques used in hydrogen purification are presented.
- Catalytic purification via hydrogen-oxygen recombination reactions is focused on here.
- Pd or Pt-based catalysts should require further development to overcome deactivation during the reaction.

GRAPHICAL ABSTRACT



ARTICLE INFO

Article history:
Received 11 August 2021
Received in revised form
29 October 2021
Accepted 6 November 2021
Available online xxx

Keywords:
Methanol steam reforming
Hydrogen
Micro-reactor
Membrane reactor
Structured catalyst

ABSTRACT

Hydrogen is currently receiving significant attention as an alternative energy resource, and among the various methods for producing hydrogen, methanol steam reforming (MSR) has attracted great attention because of its economy and practicality. Because the MSR reaction is inherently activated over catalytic materials, studies have focused on the development of noble metal-based catalysts and the improvement of existing catalysts with respect to performance and stability. However, less attention has been paid to the modification and development of innovative MSR reactors to improve their performance and efficiency. Therefore, in this review paper, we summarize the trends in the development of MSR reactor systems, including microreactors and membrane reactors, as well as the various structured catalyst materials appropriate for application in complex reactors. In addition, other engineering approaches to achieve highly efficient MSR reactors for the production of hydrogen are discussed.

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https://doi.org/10.1016/j.ijhydene.2021.11.041
0360-3199/