

Hydrogen Production from Natural Gas Steam Reforming over the Metal Monolith Catalyst with Enhanced Heat-Transfer

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Heat transfer performance of the natural gas steam reforming in a reactor bed with metal monolith catalyst has been evaluated in comparison with that in the conventional packed bed with pellet catalysts. 2%Ru/Al₂O₃ catalyst was powdered and wash-coated on metal monoliths, or used as it was for the packed bed application. Under the same degree of temperature gradient from the furnace wall to the catalyst bed, the heat flux obtained in the monolithic bed reactor was about twice higher than that in the packed bed reactor. Maximum heat transfer coefficient achieved in this study for the former was 0.65 kW/m² K, while that for the latter was 0.3 kW/m² K. This is mainly due to enhanced heat-transfer via metal monolith catalyst.