Production of synthesis gas by methane steam reforming over Rh-Pd metal foam catalyst

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In this study, methane steam reforming (MSR) reaction was performed on Rh-Pd supported over highly porous Fe-Al-Zr-Ce metal foam. A tubular reactor was used to conduct the catalytic activity, CO selectivity, H2/CO ratio and coke deposition over metal foam catalyst within temperatures range 350-850oC and steam-carbon (S/C) ratio 2.0~4.0. Metal foam catalyst exhibited high CH4 conversion and H2 selectivity towards MSR. Although coke was formed, the catalyst showed negligible deactivation after 24 h of stability test at 800o C. It was observed that methane conversion and H2/CO ratio was increased and CO selectivity was decreased when S/C ratio was increased. Interestingly, 96.7% of CH4 conversion and a H2/CO ratio of 6.09 were achieved during the stability test. Therefore, Pd-Rh metal foam catalyst has excellent catalytic activity towards MSR and can be useful for industrial application.