Catalytic performance and characterization of $Ce_xZr_yO_2$ in autothermal reforming of propane

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The catalytic performance and characterization of Ni/Ce-ZrO_2 were investigated using an autothermal reforming (ATR) process for hydrogen production The Ni/Ce-ZrO_2 catalysts were prepared by co-precipitation methods. Activity, selectivity, and coking-resistance of a series of $Ce_xZr_yO_2$ (where x, y are the respective of 0.25, 0.5, 0.75, 1.0 molar ratio; x+ y=1) catalysts have been studied for hydrogen/synthesis gas production via the catalytic autothermal reforming of propane. The effect of support composition as well as metal loading on ATR reaction was studied in a fixed-bed flow reactor, over a temperature range of 300 ℃ to 700 ℃. The activity and stability experiments for $Ce_xZr_yO_2$ (where x, y are the respective of 0.25, 0.5, 0.75 molar ratio; x+ y=1) were higher hydrogen production than other catalyst. Ceria-zirconia mixed oxide has been widely used as catalytic promoter due to its oxygen storage capacity. The addition of zirconia not only improves the life of the redox cycles but also lowers the reduction temperature. The zirconia is added to the Ceria and it forms the solid solution. Compared to conventional catalysts, Ni/Ce-ZrO_2 support provides higher resistance toward carbon formation.