

The comparative study on the preparation methods of Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalyst for the carbon dioxide reforming of methane reaction

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The effect of preparation method on the catalytic performance over Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalysts in the carbon dioxide reforming of methane (CDR) reaction has been studied. The Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalysts were prepared by co-precipitation (CP), co-impregnation (CI), and sequential impregnation (SI) methods. The catalytic properties of Ni-MgO-Ce_{0.8}Zr_{0.2}O₂ catalysts with different preparation methods are analyzed by BET, TPR and H₂-consumption. The Ni-MgO-Ce_{0.8}Zr_{0.2}O₂-CP shows excellent activity and stability due to high surface area, dispersion, small Ni crystallite size, easier reducibility. The Ni-MgO-Ce_{0.8}Zr_{0.2}O₂-CP catalysts has the highest CH₄ and CO₂ conv. (X_{CH_4} , $X_{\text{CO}_2} > 95\%$ at 800 °C for 200 h). So, Ni-MgO-Ce_{0.8}Zr_{0.2}O₂-CP catalyst regard a promising catalyst for CDR reaction. Acknowledgments: This research was supported by the Korea Ministry of Environment as Waste to Energy-Recycling Human Resource Development Project (YL-WE-19-001).