

Enhanced catalytic activity of Ni based catalyst promoted alkali metal oxide (MgO, CaO, and La₂O₃) for CDR reaction

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A comparative study between Ni–Me–Ce_{0.8}Ze_{0.2}O₂ (Me = MgO, CaO, and La₂O₃) catalysts has been performed in the carbon dioxide reforming of methane (CDR) reaction using simulated biogas that is composed by CH₄ and CO₂ as 1:1 ratio. The physicochemical properties of catalysts prepared on laboratory were examined by BET, XRD, H₂-TPR, and CO₂-TPD. Experimental results revealed that Ni–MgO–Ce_{0.8}Ze_{0.2}O₂ exhibited excellent catalytic performance (CH₄ and CO₂ conversion > 96%) at higher temperature (800 °C, GHSV = 480,000 h⁻¹). Furthermore, Ni–MgO–Ce_{0.8}Ze_{0.2}O₂ catalyst did not deactivated until 40 hours. As a result, Ni–MgO–Ce_{0.8}Ze_{0.2}O₂ catalyst can be considered as a promising catalyst for CDR reaction of biogas.

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