

Nickel Catalyst Promoted with Lanthanum- Alumina for Dry Reforming of Methane

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Abstract : In recent years, the reaction of dry reforming of methane (DRM) has attracted much attention due to its environmental and industrial importance. Various catalysts, including Ni-based catalysts, have been investigated for the DRM. Doping Ni/Al₂O₃ by lanthanum and alkaline earth element may strongly influence solid-state reaction and increases the stability of catalysts due to the lower density and high basicity of these oxides. The effect of SrO on the activity and stability of Ni/Al₂O₃-La₂O₃ in dry reforming of methane was investigated. These catalysts have been prepared with the impregnation method, calcined in air at 450 and 650°C, then characterized by BET surface area, X-ray diffraction (XRD), and scanning electron microscopy (SEM) techniques and tested in DRM. The results showed that the addition of strontium to Ni/Al₂O₃-La₂O₃ decreased the specific surface area. XRD results revealed the presence of different phases of Al₂O₃, La(OH)₃, La₂O₂CO₃, and SrCO₃. The catalytic evaluation results showed that adding SrO increased the catalytic activity and stability, that explained by the strong basicity of strontium. SEM analysis after the reaction indicates the formation of carbon over the spent catalyst and that the addition of strontium stabilized the surface of the catalyst.

Keywords : dry reforming of methane, Ni/Al₂O₃-La₂O₃ catalyst, strontium, nickel

Conference Title : ICC 2023 : International Conference on Chemistry

Conference Location : Jeddah, Saudi Arabia

Conference Dates : November 20-21, 2023