

The Preparation of High Surface Area Ni/MgAl₂O₄ Catalysts for Syngas Methanation

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Abstract : High surface area MgAl₂O₄ supported Nickel catalysts with PVA loadings varying from 0% to 15% were prepared by precipitation and impregnation method. The catalysts were characterized by low temperature N₂ adsorption/desorption, X-ray diffraction and H₂ temperature programmed reduction. Compared with Ni/γ-Al₂O₃ catalyst, Ni/MgAl₂O₄ catalysts exhibited higher activity and selectivity in high temperature. Among the catalysts, Ni/MgAl₂O₄-5P with 5 wt% PVA showed the best performance, and achieved 95% CO conversion and 96% CH₄ selectivity at 600°C, 2.0 MPa, and a WHSV of 12,000 mL·g⁻¹·h⁻¹. It also maintained good stability in 50h life test.

Keywords : methanation, MgAl₂O₄ support, PVA, high surface area

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