

Characterization and activity in dry reforming of methane on NiMg/Al and Ni/MgO catalysts

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Description

Dry reforming of methane has been investigated on two series of catalysts either prepared by co-precipitation: $n(\text{Ni}_x\text{Mg}_y)/\text{Al}$, Ni_xMg_y and Ni_xAl_y or prepared by impregnation: Ni/MgO (mol% Ni = 5, 10). The catalysts, calcined at 600–900 °C, were characterized by different techniques: BET, H₂-TPR, TPO, XRD, IR, and TEM-EDX analysis. The surface BET (30–182 m² g⁻¹) decreased with increasing the temperature of calcination, after reduction and in the presence of Mg element. The XRD analysis showed, for $n(\text{Ni}_x\text{Mg}_y)/\text{Al}$ catalysts, the presence of NiAl₂O₄ and NiO–MgO solid solutions. The catalyst reducibility decreased with increasing the temperature of pretreatment. The $n(\text{Ni}_x\text{Mg}_y)/\text{Al}$ catalysts were active for dry reforming of methane with a good resistance to coke formation. The bimetallic catalyst Ni_{0.05}Mg_{0.95} (calcined at 750 °C and tested at 800 °C) presents a poor activity. In contrast, the 5% Ni/MgO catalyst ...