

Effect of Fe or Cu addition on Ni/Mg-Al and Ni/MgO catalysts in the steam-reforming of methane

Authors

A Djaidja, A Kiennemann, A Barama

Publication date

2006/1/1

Book

Studies in surface science and catalysis

Volume

162

Pages

945-952

Publisher

Elsevier

Description

Two series of catalysts were studied: (i) Ni/Mg-Al, Ni-Fe/Mg-Al and Ni-Cu/Mg-Al (prepared by co-precipitation) and (ii) Ni/MgO, Ni-Fe/MgO and Ni-Cu/MgO (prepared by impregnation) with the aim to be tested in methane steam reforming. The catalysts were calcined at $T_c=600-900^\circ\text{C}$, characterized by chemical analysis, BET surface areas, XRD, TPR, SEM and TEM-EDX then tested in steam reforming of methane in the temperature range $T_r=600-800^\circ\text{C}$. XRD analysis showed, for both preparation, the presence of NiO-MgO, NiAl_2O_4 or MgAl_2O_4 solid solutions, Fe_2O_3 and CuO oxides; free NiO was not observed. The reducibility of the catalysts increased in the presence of Fe, due to the reduction assistance of this element. The catalytic performances decreased with increasing calcination temperature due to the progressive incorporation of NiO in the structure of solid solutions. The catalytic activity increased in ...