

## Study of Ni–M/MgO and Ni–M–Mg/Al (M= Fe or Cu) catalysts in the CH<sub>4</sub>–CO<sub>2</sub> and CH<sub>4</sub>–H<sub>2</sub>O reforming

Authors

A Djaidja, H Messaoudi, D Kaddeche, A Barama

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Description

The catalysts Ni–M/MgO prepared by impregnation of the MgO support and (Ni–M–Mg)<sub>2</sub>Al by co-precipitation method using NH<sub>4</sub>OH as precipitating agent (M=Cu or Fe), were characterized by BET surface area, X-ray diffraction (XRD), temperature programmed reduction (TPR), temperature programmed oxidation (TPO), Transmission electronic microscopy (TEM) and tested in CH<sub>4</sub>/CO<sub>2</sub> and CH<sub>4</sub>/H<sub>2</sub>O reactions. XRD analysis showed the presence of Ni<sub>x</sub>Mg<sub>1-x</sub>O (x = 0.05 or 0.1), NiAl<sub>2</sub>O<sub>4</sub> and/or MgAl<sub>2</sub>O<sub>4</sub> solid solutions. NiO was not observed on all catalysts what could confirm the formation of solid solutions. The reducibility of the catalysts increased in the presence of Cu or Fe due to the reduction assistance of these elements. The reactivity results showed very high performances (with CH<sub>4</sub> conversion and yields of H<sub>2</sub> and CO up to 90%) and a good resistance for coke formation. For the CO<sub>2</sub> reforming of methane ...