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# Ultrasound assisted co-precipitation synthesis and catalytic performance of mesoporous nanocrystalline NiO-$Al_2O_3$ powders

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***Abstract***

Mesoporous nanocrystalline NiO-$Al_2O_3$ powders with high surface area were synthesized via ultrasound assisted co-precipitation method and the potential of the selected samples as catalyst was investigated in dry reforming reaction for preparation of synthesis gas. The prepared samples were characterized by $N_2$ adsorption (BET), X-Ray diffraction (XRD), Temperature programmed reduction and oxidation (TPR,TPO) and scanning electron microscopy (SEM) techniques. The effects of pH, power of ultrasound irradiation, aging time and calcination temperature on the textural properties of the catalysts were studied. The sample prepared under specified conditions (pH10, 70W, without aging time and calcined at 600°C) exhibited the highest surface area (249.7 $m^2$ $g^{-1}$). This catalyst was calcined at different temperature and employed in dry reforming of methane and the catalytic results were compared with those obtained over the catalysts prepared by impregnation and co-precipitation methods. The results showed that the catalyst prepared by ultrasound assisted co-precipitation method exhibited

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