

Influence of calcination temperature in the low temperature oxidation of CO over CuO/Al-Ce mixed oxide catalysts

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For the oxidation catalyst, the catalytic activity depends on the various parameters such as preparation method, precipitant agent, calcination temperature of catalyst, etc. In this study, 10 wt% CuO catalyst supported on Al-Ce mixed oxide with a molar ratio, Al/Ce = 3/7 was prepared by impregnation method and calcined in the range of 400–900°C. The characterization of the prepared catalysts was performed using XRD, N₂ sorption, H₂-TPR, CO-TPR, CO-IR and N₂O titration to correlate with catalytic activities in the CO oxidation. Increasing the calcination temperature of CuO/Al-Ce mixed oxide catalysts reduces BET surface area, resulting in sintering and agglomeration of 3Al-7Ce oxide particles. Among the catalysts studied here, the catalyst calcined at 600°C showed the highest catalytic activity in the CO oxidation. It could be correlated the formation of active state of CuO cluster and a large amount of surface oxygen and hydroxyl groups on catalyst. To investigate the water effect on catalytic performance, the transition response reaction was performed.