

Effect of doped potassium in direct N_2O decomposition over K/Co_3O_4 catalyst

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N_2O is an important environmental issue due to the high global warming potential (GWP). It has 310 times higher than that of CO_2 . It is reported that Co_3O_4 is active for direct N_2O decomposition owing to its relatively high redox property. Cobalt spinel, however, which was prepared by precipitation was significantly inhibited by O_2 , H_2O at low temperature ($<400^\circ C$). To overcome this phenomenon, researchers added alkali and alkaline earth metals on cobalt spinel. Among alkali metals, this study shows that the effect of potassium on cobalt spinel at low temperature ($<400^\circ C$) in the presence of O_2 , H_2O . A potassium-doped cobalt spinel catalyst in this experiment was prepared by incipient wetness impregnation of Co_3O_4 , synthesized by precipitation. It showed higher activities than cobalt spinel without potassium. In order to clarify the effect of potassium on cobalt spinel, the prepared catalyst was characterized by BET, O_2 -TPD, H_2 -TPR, XRD and XPS. This results indicated doped potassium on cobalt spinel could lead to an increase of catalytic activities.