

Mesoporous $\text{Cu}_x\text{Co}_{3-x}\text{O}_4$ oxide catalysts for preferential oxidation of CO in H_2 -Rich stream

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Catalytic preferential oxidation (PROX) of CO in a H_2 -rich stream has recently attracted much attention, since it is considered as the simplest and the most effective method for CO removing from the gas mixtures containing concentrated H_2 for fuel cells. As we all known noble metal oxide catalysts, such as Pt, Ru, Rh, Pd and Au, have shown high activities and good stabilities for the PROX of CO. Whereas, noble metal catalysts inevitably have disadvantages of high cost and limited availability. Therefore, it is highly desirable to develop efficient non-noble transition metal oxide catalysts for the PROX of CO. In this study, ordered mesoporous $\text{Cu}_x\text{Co}_{3-x}\text{O}_4$ composite oxides with different Co/Cu atomic ratios were prepared by a co-nanocasting-replication method using mesoporous silica KIT-6 as hard template, and which were characterized by XRD, N_2 -adsorption, SEM, TEM, XPS, H_2 -TPR and CO-TPD. The results indicated that a strong interaction between Co and Cu species in these composite oxides and when the Co/Cu=1 atomic ratio at which the $\text{Cu}_x\text{Co}_{3-x}\text{O}_4$ phase was the main component. For the preferential oxidation of CO, the ratio of composite oxides is 3:7 showed the best catalytic activity than both CuO , Co_3O_4 and other composite oxides.