

Shape Effect of Ceria Nanocrystal Support for Cu/Ceria Catalysts in the Preferential CO oxidation

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The effect of ceria shape and Cu loading on the shaped support were investigated. Ceria and ceria based materials have important applications in fields such as oxidation catalysts, fuel cell electrolytes, etc. Particularly, Cu/CeO₂ catalysts have been shown to be very active for CO oxidation. In this study, Cu/CeO₂ catalysts were studied for preferential CO oxidation (PROX) reaction. We synthesized various shapes of ceria nanocrystals (-rods, -cubes, and -octahedra) by hydrothermal methods. Then, Cu with loading of 1 and 4 wt% were deposited on each shape of ceria. The morphology and activity of ceria catalysts were characterized by TEM, XPS, H₂-TPR, CO-TPR, and Raman spectroscopy. Especially, the relative concentration of oxygen vacancies was confirmed by Raman spectroscopy for various shapes. And the catalysts were evaluated for the CO oxidation in presence of excess H₂. The Cu/CeO₂ catalysts were compared before and after reaction.