

Catalytic performance enhancement over Cu/CeO<sub>2</sub> catalysts by modification of cerium impregnation sequence in the low temperature water-gas shift reaction

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The low temperature water-gas shift (LT-WGS) reaction has been carried out at gas hourly space velocity (GHSV) of 36,000 mL/g-h over Cu/CeO<sub>2</sub> catalysts modified with various cerium impregnation sequences. For the purpose of applying various cerium impregnation sequence, Cu/CeO<sub>2</sub> catalysts were prepared by various preparation methods such as co-impregnation method (Cu-Ce/CeO<sub>2</sub>) and sequential impregnation method (Ce/Cu/CeO<sub>2</sub>, Cu/Ce/CeO<sub>2</sub>). The effect of cerium impregnation sequence on the physical and chemical properties related with catalytic performance of Cu/CeO<sub>2</sub> catalysts were analyzed through various characterization techniques including N<sub>2</sub> adsorption-desorption, N<sub>2</sub>O titration, X-ray diffraction (XRD), X-ray Photoelectron Spectroscopy (XPS), Raman spectroscopy, and X-ray Absorption Fine Structure (XAFS). The characterization result for each catalyst was correlated with its catalytic activity result in the LT-WGS reaction.