

A comparative study on the activity of Cu-CeO<sub>2</sub>-ZrO<sub>2</sub> catalyst for LT-WGS depending upon the CeO<sub>2</sub>/ZrO<sub>2</sub> ratio

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A comparative study on cubic Cu-Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub> and tetragonal Cu-Ce<sub>0.2</sub>Zr<sub>0.8</sub>O<sub>2</sub> catalysts have been carried out in the Low Temperature Water Gas Shift (LT-WGS) reaction. The catalysts were prepared by the first co-precipitation / digestion method. The physicochemical properties of catalysts prepared were examined by BET, XRD, and H<sub>2</sub>-TPR. The cubic Cu-Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub> catalyst shows higher CO conversion ( $X_{CO} > 60\%$  at 400°C) than tetragonal Cu-Ce<sub>0.2</sub>Zr<sub>0.8</sub>O<sub>2</sub> catalyst at the high Gas Hourly Space Velocity (GHSV) of 72,152 h<sup>-1</sup>. The high catalytic activity of the Cu-Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub> is mainly related to the enhanced oxygen mobility and high Cu dispersion resulting from large amount of defect oxygen. In addition, cubic Cu-Ce<sub>0.8</sub>Zr<sub>0.2</sub>O<sub>2</sub> catalyst exhibits a stable activity at 320 °C for 25 h resulting from a strong resistance against sintering.

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