

A comparative study on the environment-friendly HTS catalyst for hydrogen production

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A comparative study between Me-CeO<sub>2</sub> (Me = Zn, Cu, Fe and Co) catalysts has been performed in the high temperature water-gas shift (HT-WGS) reaction using waste derived synthesis gas. The physicochemical properties of catalysts prepared on laboratory were examined by BET, XRD, and H<sub>2</sub>-TPR. Experimental results revealed that Co-CeO<sub>2</sub> exhibited higher catalytic performance than prepared catalysts. Within the Me-CeO<sub>2</sub> series, Co-CeO<sub>2</sub> exhibited excellent catalytic performance (CO conversion > 90%) at higher temperature (400 °C, GHSV = 143,000 h<sup>-1</sup>). Furthermore, Co-CeO<sub>2</sub> catalyst did not promote undesirable side reactions. As a result, Co-CeO<sub>2</sub> catalyst can be considered as a promising catalyst for HT-WGS in waste-derived synthesis gas because it exhibits more excellent stability than commercial (Fe<sub>2</sub>O<sub>3</sub>-Cr<sub>2</sub>O<sub>3</sub>) catalysts.