

The influence of Cu-loading on the activity and stability over co-precipitated Cu-Ce_{0.8}Zr_{0.2}O₂
Catalyst for the LT-WGS reaction

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A single stage water-gas shift reaction (WGS: $\text{CO} + \text{H}_2\text{O} \rightarrow \text{CO}_2 + \text{H}_2$) is crucial step in a fuel processor for compact fuel cell systems. The Cu loading of a cubic Ce_{0.8}Zr_{0.2}O₂-supported Cu catalyst was optimized for a single-stage WGS reaction. The cubic phase of Cu-Ce_{0.8}Zr_{0.2}O₂ catalyst showed the highest CO conversion as well as stability with time on stream due to high oxygen storage capacity. The remarkable catalytic performance of Cu-Ce_{0.8}Zr_{0.2}O₂ is mainly ascribed to the synergy effect of Ce_{0.8}Zr_{0.2}O₂ solid solution, resulting from high Cu dispersion, and enhanced reducibility of catalyst. Furthermore, Cu-loading on the CeO₂-ZrO₂ structure improved the redox properties of the material and restricted the metal sintering, leading thus to a further improvement in the catalytic performance. In the present study, we focus on the optimum loading of Cu over cubic Ce_{0.8}Zr_{0.2}O₂ support to further improve the performance of the catalyst.