

Low-temperature water-gas shift reaction over metal doping mesoporous cerium oxide catalysts

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The water gas shift (WGS) reaction allows the conversion of carbon monoxide and water to hydrogen and carbon dioxide; the WGS has become an important technology in the chemical industry, particularly in relation to the production of clean hydrogen and energy recovering systems. Ceria-based materials have shown rather interesting properties in catalyst about 40 years, unveiling thus potential to become real alternatives in the future.

Cu-CeO₂ systems are among the most active WGS systems and, compared with Pd, Pt, Au and, generally, expensive noble metal based materials, they constitute an interesting alternative from an economical point of view. Among possible different configurations of Cu-CeO₂ materials, Cu-Ce mixed oxides have shown reasonable activity and relatively good stability. Due to the different chemical and usually structural properties of doping of ceria strongly affects its inherent physic-chemical properties.

In this work, a series of metal doping mesoporous cerium oxide catalysts prepared by nano-replication method was evaluated in the WGS reaction. At low temperature ranges (< 350 °C) the as-prepared catalyst shows great activity.