



Study on catalysts incorporated with M (Cu, Ni, Zn, and Co) for high temperature water–gas shift reaction from waste derived synthesis gas

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ABSTRACT

Study on Fe₃O₄ using Cu, Zn, Ni and Co catalysts (M-Fe-Al-Glycine, M-FAG) have been carried out in the High Temperature Water Gas Shift (HT–WGS, CO + H₂O → CO₂ + H₂) reaction using waste-derived synthesis gas. The catalysts were prepared by Sol-gel method using glycine among various preparations. The zwitterionic nature of glycine can incorporation of the promoter metal ions. Also, the reducing atmosphere created by glycine makes it possible to prepare magnetite directly. The physicochemical properties of the prepared catalysts were compared by BET, XRD and H₂-TPR. As a result of the experiment, Cu-FAG catalytic performance than other M-FAG catalysts. In addition, the loading of Cu was varied range from 2.5 mol% to 15.0 mol% for optimization. As a result, the 12.5 mol% Cu-FAG catalyst showed outstanding catalytic performance (X_{CO} = 86% at 400 °C) and was identified as a promising catalyst for high purity hydrogen production in the HT-WGS reaction.

Keywords: Copper; High temperature water gas shift; Hydrogen; M-FAG catalysts; Sol-gel;

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