

A comparison study on spinel ferrite catalysts for HT-water gas shift reaction using waste-derived synthesis gas

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In this study we synthesize  $AFe_2O_4$  spinel ferrite (A = Ni, Co, Mn, Mg, or Zn) catalysts prepared by the sol-gel combustion method using the amino acid glycine (98.5%, Aldrich) and compared the catalytic activity of Ni, Co, Mn, Mg, or Zn substituted spinel ferrite catalysts for the High Temperature water-gas Shift (HTS:  $CO + H_2O \leftrightarrow H_2 + CO_2$ ) reaction. The sol-gel combustion method which is combined a chemical sol-gel method and combustion method has benefits as follows: relatively short processing time and production of ultrafine particles with narrow size distribution. The  $NiFe_2O_4$  catalyst exhibited the highest CO conversion with stability among the prepared catalysts. This is primarily due to the inverse spinel structure and easier reducibility of the  $NiFe_2O_4$  catalyst.

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