Citric acid assisted direct synthesis of Fe_3O_4 catalysts for the high temperature water gas shift reaction over the simulated waste-derived syngas

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The objective of the present work is to prepare chromium free iron oxide catalysts in its active phase Fe_3O_4 and to evaluate its catalytic performance in high temperature water gas shift reaction. The catalysts were prepared by using citric acid as a complexing agent. According to reaction result, the variation of citric acid molar ratio influenced the catalytic performance. Especially, the prepared catalyst (the citric acid molar ratio of 1.0) showed 80% CO conversion at 350 °C at very high GHSV of 40,057 h^{-1}.