

Physico-chemical properties of precipitated iron-based catalysts with and without SiO₂ for the Fischer-Tropsch synthesis

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Iron-based catalysts have received much attention as catalysts for the Fischer-Tropsch synthesis (FTS) due to their high activity, low cost, and potential activity for the water-gas shift reaction. Various chemical and structural promoters such as SiO₂, Cu, and K₂O have been used to improve the catalytic performance of precipitated iron catalysts. In this study, we investigated the physico-chemical properties of precipitated iron-based catalysts with and without SiO₂ addition. The catalysts with SiO₂ were prepared by two comparative ways, i.e., incorporation of SiO₂ before precipitation (denoted as precipitated SiO₂) and after precipitation (denoted as binder SiO₂), respectively. Catalyst characterization revealed that the catalysts with precipitated SiO₂ showed the higher dispersion of catalysts and/or promoters than the catalysts with binder SiO₂ and those without SiO₂. In terms of surface basicity, the catalysts without SiO₂ showed higher value than those with SiO₂.