

Direct synthesis of ϵ -Fe₂C through α -Fe metal phase for Fischer-Tropsch synthesis

김희원, 차승희, 하경수[†]
서강대학교
(philoseus@sogang.ac.kr[†])

In iron-based Fischer-Tropsch synthesis (FTS), various iron carbides are known to be the active phases. Among them, ϵ -Fe₂C has high stability and low CO₂ selectivity in FTS. For preparation of ϵ -Fe₂C, at least 12 h of reduction to α -Fe with H₂ is necessary. In this study, activated carbon (AC) was used as support of the catalyst as well as sacrificial reductant. This makes synthesis of carbon supported pure α -Fe metal phase facile. Pretreatment of the pure α -Fe metal phase with syngas at 250 °C can lead to the formation of ϵ -Fe₂C. The ϵ -Fe₂C phase was identified by XRD and TEM analyses. After the pretreatment step, FTS activity test was conducted with the catalyst. Fresh and spent catalysts were also analyzed by XRD, TEM, SAED methods.