

Effect of alkali treatment on the activity of iron supported catalyst in Fischer-Tropsch synthesis

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Fischer-Tropsch synthesis (FTS) was carried out using iron based catalysts supported on SiO₂ and Al₂O₃ by incipient wetness method. Al₂O₃ support was surface treated by Na/NaOH. Supported iron based catalysts activity were compared with that of the catalyst prepared by conventional co-precipitation method. The reaction was carried out in a continuous stirred tank reactor (CSTR) with volume of 500cc at 275°C and 25atm using synthesis gas of H₂/CO ratio 1 as a simulated feedstock produced from the coal gasifier. Simulated distillation (SIMDIS) analysis method was used to determine the products distribution. The catalysts physical and chemical properties were analyzed by BET, SEM, PSA, XRD and H₂-TPR. Supported iron based catalysts had spherical morphology with particle size of 10~70µm. Supported iron based catalysts showed comparable activity in contrast to that of prepared from conventional co-precipitated method when activated at much higher temperatures. Supported catalysts were expected to have better attrition strength when used in commercial reactor such as slurry bubble column reactor.