Study of carbon monoxide hydrogenation to higher hydrocarbons over nano-sized iron catalyst

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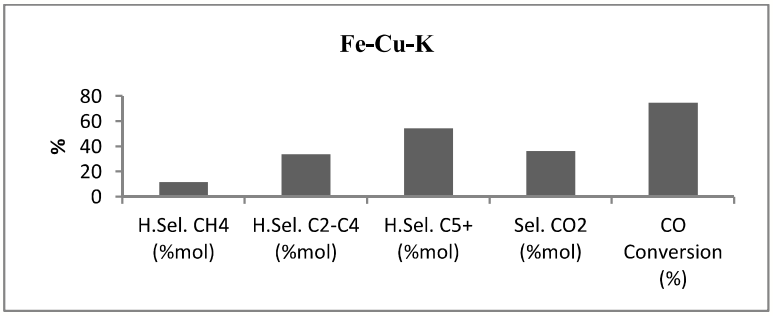
Fischer–Tropsch synthesis (FTS) is an established technological route for upgrading natural gas, coal, and biomass to liquid fuels and other chemical products[1-4]. In this study, the nano-sized iron catalyst prepared by microemulsion method. The catalyst characterized using N_2 physical adsorption, temperature-programmed reduction (TPR) , X-Ray and TEM techniques.The FTS performances of the catalyst tested in a fixed-bed stainless steel reactor. Iron catalyst with K promoter significantly improve the FTS and WGS activities and decrease secondary reactions.

$$CO + H_2 \xrightarrow[P=17\ atm,\ H_2/CO=1\ T=290\ ^oC]{GHSV=3nl.h^{-1}.gCat^{-1}} -(CH_n)- + H_2O + CO_2$$



References:

1. D.B. Bukur, D. Mukesh, S.A. Patal, *Ind. Eng. Chem. Res.* **1990**,29, 194-200.
2. Davis B H. *Catal Today*, **2009**, 141, 25-31.
3. Van Der Laan G P, Beenackers A A C M. *Catal Rev-Sci Eng*, **1999**, 41, 255-281.
4. Pour A N, Shahri S MK, Bozorgzadeh H R, Zamani Y, Tavasoli A, Marvast M A. *Appl Catal A*. **2008**, 348,201-208.
5. A. Nakhaei Pour, S. Taghipoor, M. Shekarriz,S. M. K. Shahri,Y. Zamani, *J.Nanosci.Nanotech*.**2009**,9 , 4425-4429.
6. Y. Zamani, M. Bakavoli, M. Rahimizadeh, A. Mohajeri, S. M. Seyedi, *Chin. J. Catal*. **2012**, 33, 1119–1124.