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# Cobalt catalyst applied in Fischer-Tropsch synthesis with carbon nanotubes support materials

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Fischer-Tropsch synthesis (FTS) has shown a higher activity with Co, Fe, and Ru metals ect. The activity and selectivity to linear hydrocarbons of cobalt catalysts are high, and low activity for the water gas shift (WGS) reaction for FTS. The activity of cobalt catalysts are about supports, prepare method and metal particles. Many researchers have been focused so far on various supports: aluminar, silica, titania and carbon materials. Wenping Ma has reported that activated carbon support cobalt catalyst applied for FTS, and investigate promoters effect on catalyst performance. Jong et al has investigated for the first time using carbon nanofiber support research FTS. In recent years, CNTs are a greatly interest of fundamental and nanoelectronic application because of their unique electronic properties.

Carbon nanotubes with unique properties such as uniform pore size distribution, meso and macro pore structure, inert surface properties, and resistance to acid and base environment can play an important role in a large number of catalytic reactions. CNTs are essentially composed of graphite layers with a tubular morphology. Structural parameters of CNT such as inner and outer diameter and length of nanotubes can be manipulated using different synthesis processes and operating conditions. It has been shown that CNT supports offer improved performance for FT reactions. In application of CNT supports, the effects of pore size and diameter of carbon nanotubes on the catalytic performance of FT catalysts have not been elucidated yet. CNTs have been aroused great attention why it possess uniform properties and stable propret. Dalai group has systematically reported iron or cobalt carbon by nanotubes support in FTS.

In this research, FTS is carried on the performance of cobalt/CNTs or activity carbon as supports under various reaction conditions. And the different treated method of CNTs supports, the optimum reaction conditions and cobalt precursors are discussed and designed. The results indicated that the activity of the 10%Co/inside-CNTs catalyst is higher than other catalyst supports. The activity of the catalysts was increased, and stability on the support was treated by acid and high temperature.

*Keywords:* Fischer–Tropsch synthesis; Cobalt, Carbon nanotube, Treated method

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