



## Preparation of Ru-Co catalysts over mixed supports for Fischer-Tropsch synthesis

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One step production of hydrocarbons from syngas is demonstrated by combination of Fischer–Tropsch synthesis (FTS) and acid functionalities in one single bifunctional catalyst particle. In this research studies on synthesis and characterization of two different catalyst configurations were prepared in which the acid functionality of SiO<sub>2</sub> and H-ZSM-5 zeolite conjoins the cobalt FTS active phase by co-impregnation method: (i) 15%Co/SiO<sub>2</sub> (ii) 1%Ru-15Co/SiO<sub>2</sub> (iii) 1%Ru-15Co/SiO<sub>2</sub>+HZSM-5 (iv) 1%Ru-15Co/HZSM-5., at room temperature. Structure of the studied catalysts are carried out by X-rays Diffractometer (XRD), which revealed of catalyst calcined temperature at 673 K. Metal component analysis of synthetic catalysts (15% Co/SiO<sub>2</sub>, 1% Ru-15Co/SiO<sub>2</sub>, 1% Ru-15Co/SiO<sub>2</sub>+HZSM-5 and 1% Ru-15Co/HZSM-5.) are identified by X-rays Fluorescence (XRF) technique. Morphologies of all samples are checked by Scanning electron microscopy (SEM). BET surface area, pore volume and pore size distribution were estimated from nitrogen desorption isotherm. The reaction was performed in temperature at 473 K and 1 MPa and H<sub>2</sub>/CO = 2. The suitable addition of Ru improved Co dispersion and reducibility of Co<sub>3</sub>O<sub>4</sub>, as confirmed by Scanning electron microscopy (SEM) and Temperature Program Reduction (TPR) consequently. The 1%Ru-20Co/SiO<sub>2</sub>+HZSM-5 catalyst gave the highest CO conversion, and also higher selectivity of gasoline-range hydrocarbon which contain isoparaffins more than another catalysts.

**Keywords:** Fischer Tropsch synthesis, Gas-to-liquids, Cobalt catalyst, Noble metal promoters