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Fischer-Tropsch Synthesis over Metal-promoted Co-Ir-SiO_2 Catalysts Prepared by the Alkoxide Method

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A series of metal-promoted 20 wt%Co-0.5 wt%Ir-SiO_2 catalysts was prepared by the alkoxide method, and the effects of additives (MO_x; M = K, Cr, Al, Ce, La, and Mn) on the catalysis of Fischer-Tropsch reaction were investigated. K-Promoter reduced CO conversion. Al- or Cr-promoter resulted in almost the same CO conversion as over the catalyst without additives, but CH_4 selectivity increased. La- or Ce-promoter decreased C_{5+} selectivity. In contrast, CO conversion and the α-value (the chain growth probability of CH_x intermediates) increased up to 57% and 0.85, respectively, over catalysts with 10 wt% Mn promoter. However, further addition of Mn caused deactivation of the catalyst. Selectivity for CH_4 showed a linear relationship with the standard enthalpy of formation ($-\Delta H_f^0$) of the promoter oxides (MO_x).

Keywords: Additive, Alkoxide method, Cobalt catalyst, Fischer-Tropsch reaction, Sol-gel method

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