Effect of Pretreatment on the Activity of a Ru Promoted Co- Zr /SiO_2 for Fischer-Tropsch Catalyst

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A series of Co-Ru-Zr/SiO2 catalysts was prepared by the co-impregnation method in order to understand the effect of calcination temperature on their activity and selectivity. The catalysts were characterized by XRD, BET S.A, pore volume and pore size distribution, simultaneous differential scanning calorimetry (DSC) and differential thermogravimetric analysis (TGA), hydrogen chemisorption, oxygen titration and temperature programmed reduction (TPR) techniques. The particle size of cobalt decreased upto a calcination temperature of 300℃ and then on increased reaching a reasonably constant value. The activity of the catalysts in CO hydrogenation increased upto a calcination temperature of 300℃ and then on decreased stabilizing at a value smaller than the optimum. The olefin selectivity also varied proportionately. It was observed that in the presence of chlorine released during the decomposition of the zirconium oxychloride, the dispersion of cobalt particles occurred and when it ceased there was sintering. The optimum temperature of calcination was observed as 300℃.