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Cobalt catalyst prepn. - involving calcination in an atmos. contg. nitrogen oxide is suitable for prepn. of hydrocarbon cpds from carbon monoxide and hydrogen

C91-043945

E(10-J2D) H(4-E5, 4-F2E) J(4-E4) N(2-B1)

The prepn. of a catalyst, or catalyst precursor, suitable for the prepn. of hydrocarbons from CO and H₂ is effected by applying a Co cpd. to a porous, inert carrier, drying and calcining. The Co cpd. is cobalt nitrate and the carrier provided with the Co cpd. is calcined in an atmos. contg. nitrogen oxide in at least 20 vol.% (not considering the water content of the atmos.).

A catalyst suitable for the prepn. of hydrocarbons from CO and H₂ after activation is also claimed and comprises agglomerates of cobalt oxide crystallites distributed over a porous inert carrier having agglomerate size of 1-10 (1-5) micrometres.

Hydrocarbons can be prepd. by catalytic reaction of CO and H₂ using the claimed catalyst and the prod. of the process.

ADVANTAGE

The catalyst gives similar yields to other catalysts but at lower temps. thus leading to lower occurrence of side reactions and less iso-hydrocarbon formation.

PREFERRED

The concn. of nitrogen oxide is pref. 25-100 (40-95, esp. 60-90) vol.%. It is pref. at least partly formed by the decompsn. of the cobalt nitrate. The cobalt oxide agglomerate size is pref. 1-3 (1.5-2.5)micrometre.

The carrier is selected from silica (pref.), alumina, zirconia, titania and mixts. of these.

The calcination temp. is 200-700 (300-600)°C.

The catalysts pref. contains 3-80 (15-50) parts by wt. Co, and optionally 0.05-0.5 parts by wt. Ru and 0.1-100 parts by wt. other metal (pref. 5-40 parts Zr).

HYDROCARBON PREPARATION

The catalytic formation of hydrocarbons from CO and H₂ is carried out at 100-500 (150-300, esp. 180-230)°C and 1-200 (5-100, esp. 15-30) bar with a SV = 200-20000 (500-5000)m³ gaseous feed/m³ reaction zone/hr. The gaseous

feed has H:CO of 0.4-4. (0.8-2.5, esp. 1-1.5).

EXAMPLE

Zirconia particles were deposited on the surface of a silica carrier which was then impregnated with aq. cobalt nitrate soln. The dried particles were divided into 2 portions, one of which (a) was dried in a rotating film evaporator using an oil bath at 200°C and air purge stream (25°C). The other portion (b) was dried in a hot gas in a vibrating bed configuration (250°C, simulating a belt drier).

Each of these samples was divided into 2 parts (a-1, a-2 and b-1, b-2), one of each (a-1, b-1) being calcined for 1h at 500°C and the others (a-2, b-2) being calcined in a std. fixed bed configuration using an air stream (GHSV = 5000) resulting in a low nitrogen oxide partial pressure (less than 2%) in the catalyst bed.

Each catalyst sample (CO_3O_4 (34 pts. by wt.), ZrO_2 (16 parts by wt.) and SiO_2 (100 parts by wt.)) was reduced (260°C, 3 bar, 6000 GHSV) in a gas stream with an increasing H_2 concn. (1-100%).

These were tested at 21 bar, 800 GHSV and H_2 : CO of 2. At the same std. yield, the claimed catalysts comprising agglomerates of cobalt crystallites gave the same yield at lower temps. (11pp1996SLDwgNo0/0)