86-077101/12 E17 H04 J04 SHEL 13.09.84
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Prepn. of hydrocarbon(s) from synthesis gas - over non-homogeneous supported cobalt catalyst

C86-032826 E(AT BE DE FR IT NL SE)

Hydrocarbons (I) are prepd. by the reaction of CO with H_2 at elevated temps. over a supported Co catalyst. In the catalyst the cobalt is distributed over the carrier to satisfy eqn. 1:

$$\sum V_p / \sum V_c \text{ less than } 0.85$$

$\sum V_c$ = total vol. of the catalyst particles;

$\sum V_p$ = total peel volumina in the catalyst particles, when these are taken to be composed of a kernel surrounded by a peel, and the kernel is of a shape such that at every pt. of its perimeter the shortest distance (d) to the perimeter of the peel is the same, and that (d) is eq. for all catalyst particles and has been chosen so that the amt. of Co present in $\sum V_p$ is 90% of the amt. of Co present in $\sum V_c$.

E(10-J2D) H(4-E5) J(4-E1) N(2-B)

USES/ ADVANTAGE

The above catalysts in which the Co is non-homogeneously distributed over the carrier show much higher C_5 + selectivity than similar catalysts in which the Co is distributed homogeneously.

PREFERRED PROCESS

The reaction is carried out at 125-350 esp. 175-275°C/ 5-100 esp. 10-75 bar.

Prefd. catalysts contain (by wt.) 3-60 esp. 5-50 pts. Co/ 100 pts. carrier, and pref. also a promoter (pref. Ti, Cr, Ru esp. Zr) (0.1-5 pts. if Co deposited on the carrier before the promoter, or 5-40 pts. if the promoter deposited first; both per 100 pts. of carrier).

Carrier is pref. Al_2O_3, or Al_2O_3/ SiO_2 esp. SiO_2.

The catalyst is pref. a fixed bed of external surface area (S_E) 5-70 cm^2/ ml. and is characterised by:

$$0.03 \times \sqrt{S_E} < \frac{\sum V_p}{\sum V_c} < 0.3 \times \sqrt{S_E}$$

PREPARATION

The catalyst is made by keeping particles of a porous carrier immersed in H_2O for 30 min. and, upon drip-drying, keeping the H_2O-satd. carrier several times (each 30 sec.) in a soln. of a Co salt in H_2O, and drying and calcining after each immersion.

EXAMPLE

Using an 18% Co/SiO_2 catalyst with 0.9% Zr promoter ($\sum V_p / \sum V_c$ = 0.75) at 235°C./20 bar, a C_5 + selectivity of 65% by wt. was obtd..(11pp478RHDwgNo0/0).

(E)ISR: EP-109702.