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Hydrocarbon prodn. from synthesis gas - using metal-contg. catalyst based on laminar support

E(10-J2D) H(4-E5, 4-F2E) N(2, 3-D)
002

Prodn. of hydrocarbons from a mixt. of CO and H_2 is carried out using a catalyst comprising (a) one or more metal components with catalytic activity for conversion of H_2/CO mixts. to acyclic hydrocarbons, and (b) a support comprising a layered structure (esp. a crystalline silicate) capable of absorbing metal ions or salts by intercalation.

ADVANTAGES

The process gives high conversion at acceptable space velocities, with high selectivity for gasoline-range (5-12C) hydrocarbons.

DETAILS

The support is esp. magadiite ($Na_2Si_{14}O_29.9H_2O$), but other silicates of Al, Fe and/or Ga, including other clay minerals of the candite, smectite and/or vermiculite type, can also be used. Component (a) may be Fe, Ni, Co, Cr and/or Ru. The catalysts can be prepd. by ion exchange. Prefd. catalysts comprise (i) magadiite ion-exchanged with 0.1-10 wt.% Co and impreganted with up to 10 wt.% Cr, and (ii) magadiite ion-exchanged with 0.1-15 wt.% Ru. Hydrocarbon synthesis is pref. effected at 125-375°C and 1-150 bar.

EXAMPLE

A catalyst of compsn. 25 Co/1 Cr/296 SiO_2 was prepd. by converting magadiite to NH_4 form by ion exchange with conc. NH_4OH, impregnating with aq. $Cr(NO_3)_3$ soln., ion exchanging with aq. $Co(NH_3)_6(NO_3)_2$ soln., drying at 110°C, calcining in air at 500°C for 2 hrs., and reducing in H_2 at 575°C for 24 hrs. A 1:1 mixt. of H_2 and CO was passed over the catalyst at 260°C and 20 bar (GHSV = 1000). The conversion was 71% with 22% selectivity for 1-2C hydrocarbons, 10% for 3-4C, 50% for 5-12C, 12% for 13-19C and 6% for higher hydrocarbons.(12pp367)