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Prodn. of middle distillate of high normal, iso ratio - from syn-gas by Fischer Tropsch reaction followed, without sepn., by hydrocracking

C85-041028

Prodn. of middle distillates comprises;

(i) contacting a feed contg. H_2 and CO at high temp. and pressure with a catalyst contg. 3-60 pbw Co, 0.1-100 pbw of one or more of Zr, Ti and Cr, and 100 pbw SiO_2, Al_2O_3 or SiO_2-Al_2O_3, which catalyst has been prepd. by kneading and/or impregnation; and

(ii) submitting the whole prod. from step (i) to hydrocracking conditions of high temp. and a pressure the same as in step (i), with a catalyst comprising Gp. VIII noble metal(s) supported on a carrier.

The H_2/CO ratio of the feed, and the reaction conditions in step (i) is such that sufficient unreacted H_2 enters step (ii) to effect hydrocracking.

USE/ADVANTAGE

The prod. contains middle distillates, at a yield of e.g. 44 wt.% gas oil (b.pt. 200-360°C) on C_{5+} prod., which have high normal/iso paraffin ratio (e.g. 10.5) and are therefore likely to provide diesel fuels of high cetane value. "Series flow" operation as claimed is simpler and considerably cheaper than the similar process of NL 8301922, where step (ii) is effected on a sepd. fraction of the step (i) prod. and at higher pressure.

H(4-B3, 4-F2B) N(3-B, 3-D)

PREFERRED CATALYSTS

The step (i) catalyst is pref. such that (3+4R)exceeds L/S, which exceeds (0.3+0.4R).
L = total amt. of Co present (mg Co/ml).
S = surface area (m^2/ml).
R = wt. ratio of quantity of Co deposited by kneading to the total quantity of Co present.

The catalyst pref. also contains Zr and a SiO_2 carrier. The catalyst and its prepn. are further described in NL 8301922.

The step (ii) catalyst pref. contains 0.1-2 (esp. 0.2-1) wt.% of noble metal(s), esp. including Pt or Pd, with an oxide carrier, pref. SiO_2-Al_2O_3.

PREFERRED CONDITIONS

Pref., step (i) is effected at 125-350 (esp. 175-275)°C, and step (ii) at 200-400 (esp. 250-350)°C. The pressure in

both steps is pref. 5-100 (esp. 10-75) bar. For highest possible CO conversion, the H_2/CO molar ratio should be 2 or more; very suitable is the mixt., of H_2/CO = about 3, obtd. by steam reforming of natural gas.(6pp1492MHDwgNo0/0)