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Catalytic composite of iron oxide, hydrogel matrix and zeolite - for converting synthesis gas to naphtha

D/S: E(DT,GB,SW).

A synthesis gas conversion catalyst is prepd. by treating a dried (pref. spray-dried) composite of Fe oxide (particle size = $\leqslant$ 200 μ) (I), a hydrogel matrix (II) and an acidic crystalline aluminosilicate zeolite (III) having an SiO_2: Al_2O_3 ratio of $>$ 12 and a constraint index of 1-12 with CO at elevated temps.

Also claimed are the catalyst, as prepd. above, and a method of converting synthesis gas to naphtha using the catalyst.

ADVANTAGES

The catalysts, which require no promoters, exhibit high activity in converting synthesis gas to olefinic or aromatic naphtha, producing $\leqslant$ 30 wt % methane + ethane. Little aging is evident.

DETAILS

The composite is prepd. by forming a mixt. of (I), in amts. to give 2.5-20 (pref. 2.5-10) wt % Fe (calc. as the metal and based on the finished catalyst), (II), pref. SiO_2, Al_2O_3 or SiO_2/Al_2O_3, and (III), pref. ZSM-5, and treating with CO (pref. in the form of synthesis gas) is suitably at 550-650°F for 0.5-24 hrs.

Instead of (I), Fe powder may be used; in this case the composite should be calcined prior to drying and CO-treatment. The powder, whether Fe or oxide, should be relatively pure and of particle size 10-90 μ. Electrolytically reduced Fe or submicron Fe powder (Pyron Corp) are partic. suitable.

The conversion of synthesis gas to naphtha is effected at 500-600°F and 50-1000 psig. (24pp920).

(E) ISR: US4086262, US4159995.

H(4-D, 4-E5, 4-F2E) N(2-A1).

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