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 CIE FRANCAISE RAFFINAGE \*EP-148-048-A  
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 Catalyst contg. supported iron or cobalt catalyst - and zeolite, for  
 converting synthesis gas to hydrocarbon(s) with high aromatics  
 content

CR5-072886 D/S: BE DE GB IT LN NL SE.

A new catalyst compsn. comprises a powder mixt. of  
 (a) an Fe or Co cpd. active in Fischer-Tropsch synthesis,  
 on  
 (b) a support, and  
 (c) a zeolite.

#### USE

Conversion of synthesis gas into a hydrocarbon mixt.  
 with high aromatic content is claimed.

#### ADVANTAGE

The aromatising activity of the zeolite is not altered  
 by the presence of the active cpds. immobilised on the  
 support. The content of aromatic hydrocarbons in the prod.  
 does not diminish with time.

#### PREFERRED CONDITIONS

The conditions are 200-500°C, 1-100 bars, feed rate of

E(10-J2B3, 31-P2, 35-U, 35-V) H(4-F2E) J(4-E4) N(2-A, 2-B, 6-A, 1 9 9  
 6-B)

100-10000 vols./vol.h, and H<sub>2</sub>:CO ratio in the feed of 0.5-3.5

#### PREFERRED CATALYST

The catalyst contains 5-98 wt.% of zeolite and 95-2%  
 of Fe or Co cpd.. The zeolite is esp. of the ZSM-5 (pref.),  
 ZSM-11, ZSM-12, ZSM-34, ZSM-35, ZSM-38, ZSM-48, zeolite  
 PHI or zeolite BETA type, or any crystalline, microporous  
 metal silicate cpd.. The support is esp. Al<sub>2</sub>O<sub>3</sub>, SiO<sub>2</sub>, a  
 zeolite, clay, intercalated clay, and/or any metal oxide;  
 pref. it is Al<sub>2</sub>O<sub>3</sub> with pore size 3-20,000 Å. The cpd.  
 contains Fe or Co as metal or oxide, opt. combined with Cu,  
 Fe, Al, Cr oxide, alkali(ne earth) cpds., Ru or rare earths  
 either oxidised or reduced, as promoter. The cpd. may  
 also contain K<sub>2</sub>O as promoter.

#### EXAMPLE

The catalyst comprised: (A) 10 wt.% Fe<sub>2</sub>O<sub>3</sub> and 5% K<sub>2</sub>O  
 on Al<sub>2</sub>O<sub>3</sub> with pore size 3000 Å and particle size 0.25-0.50  
 mm, and (B) a mixt. of 20 pts. wt. of catalyst A and 80 pts.  
 wt. of zeolite H-ZSM-5. A synthesis gas with ratio H<sub>2</sub>:CO  
 of 1.5 was converted at 2550 vols./vol./h, 17 bars total  
 pressure, 10.2 bars partial pressure of H<sub>2</sub> and 6.8 bars  
 partial pressure of CO,

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and 300°C for (A) 8 h, or (B) 5 h. The results were:  
CO conversion, A 95.1%, B 87.2%; C converted to CO<sub>2</sub>, A 59.7  
moles.%, B 56.7 moles.%; C converted to hydrocarbons, A 40.3  
moles.%, B 43.3 moles.%; 1-4C hydrocarbons, A 44%, B 58.4%;  
gasoline cut (5-10C), A 38.1%, aromatics content 0%; B 33.6%,  
aromatic content 47.8%; 10+C fraction, A 17.9%, B 8.0%. (18pp  
510RHDwgNo0/0).

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