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DOW CHEMICAL CO *EP -180-719-A
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Prepn. of ethanol and higher alcohol(s) - from hydrogen, carbon mon:oxide and lower alcohol esp. methanol

C86-053823 E(BE DE FR GB IT NL SE)

E(10-E4E) H(4-E5, 6-D4) J(4-E1) N(1-A, 1-B, 3-C, 3-D)

Prepn. of higher alcohols comprises reacting a lower alcohol, hydrogen and carbon monoxide in the presence of a heterogeneous catalyst comprising:

(A) a first component of Mo and/or W in free or combined form and

(B) a second component of alkali and/or alkaline earth element in free or combined form.

USE/ADVANTAGE

For prodn. of 2-6C alcohols, esp. a mixed alcohol stream contg. under 50 wt.% methanol. Methanol is converted to higher valued higher alcohols. As much as 40 wt.% of the CO may be converted and high selectivity to the alcohols is obtd.

Prods. are useful as gasoline additive.

CATALYST

A third catalyst component of Co, Ni and/or Fe may be present in free or combined form. The first component is pref. Mo and in partic. the catalyst comprises Mo sulphide and Co sulphide. Opt. a catalyst support is present.

PREFERRED REACTION

Pref. the lower alcohol component contains methanol which may be obtd. by fractionating a mixed alcohol prod. contg. methanol and the higher alcohols. Conversion of methanol to ethanol and other higher alcohols is specifically claimed.

Hydrogen to CO molar ratio is 0.7-3:1. Reaction is at 200-400 deg.C under 500-10000 psig (3.55-69.1 MPa) pressure. Pref. at least 25 wt.% of the lower alcohol reactant is converted to higher alcohol.

EXAMPLE

Approx. 1 ft³ "Witco MBV 4-6" mesh carbon 3/16 inch extrudates were immersed in soln. contg. 155.5 pounds 22% ammonium sulphide, 26 pounds ammonium heptamolybdate and 6.5 pounds potassium carbonate at 60-70 deg.C for 10 mins.,

then calcined at 300 deg.C for 4 hours. These steps are repeated until 20% Mo and 5% K based on the total catalyst wt. are absorbed.

Then the catalyst is calcined at 500 deg.C and passivated with 2% oxygen in nitrogen at up to 70 deg.C.

Gas mixts. of hydrogen and H_2S and CO and nitrogen are combined together with methanol and passed through 22g/30 cm^3 of the catalyst at 260 deg.C and 2500 psig with H_2/CO GHSV 1870 hr^{-1}, H_2/CO mole ratio 1.12, H_2S level 20 ppm and methanol feed rate 5.9 g/hr.

Prod. mixt. contained the following components expressed in g/hr: methanol 7.76 (2.42), ethanol 1.57 (0.81), propanols 0.27 (0.15), butanols 0.023 (0.016), methyl acetate 0.211 (0.0433), ethyl acetate 0.015 (0.016) and pentanols - (-). The bracketed values were obtd. in a comparison reaction in which the methanol reactant was absent. (27pp945RBHDwgNo0/0).

(E) ISR: No Search Report.