

87-170181/24 E17 H04 AIRP 05.06.85
 AIR PRODUCTS & CHEM INC *US 4670-472-A

13.05.86-US-862744 (+US-741403) (02.06.87) C07c-01/04

Converting syn:gas pref. to 5-25C hydrocarbon(s) using catalyst - prepd. by reacting alumina or silica with zirconium, titanium or hafnium alkoxide, then impregnating with iron or ruthenium carbonyl

C87-070919

Cip 4619910

Process for converting syngas preferentially to 5-25C hydrocarbons at CO:H₂ mole ratio 1:1 to 3:1, GHSV 200-1000, 200-350°C and 200-1000 psig is improved by using a catalyst prepd. by: (a) treating an inert, Al₂O₃ catalyst base with a non-aq. soln. of a Zr, Ti or Hf alkoxide, and removing the non-aq. soln.; (b) impregnating the prod. of step (a) with a non-aq. soln. of Fe or Ru carbonyl, and removing the non-aq. soln.; and (c) exposing the prod. of step (b) to a reducing atmos.; all while maintaining the Al₂O₃ and prods. under conditions avoiding their hydrolysis, oxidn. and calcination.

A process as above, except that Al₂O₃ is replaced by SiO₂, is also claimed.

E(10-J2D3) H(4-E5, 4-F2E) N(1-C2, 1-D, 2-A, 2-E, 3-B, 6-E)

USE/ADVANTAGE

E.g. a Ru/Zr/Al₂O₃ catalyst showed a selectivity to produce high yields of 5-11C gasoline-range hydrocarbons, with a sharp cutoff at 28-30C, preventing the formation of heavy waxes and so minimising the need for withdrawal of catalyst and slurry from a reactor. A Fe/Zr/Al₂O₃ catalyst showed a hydrocarbon selectivity centred in the 4-5C range. The selectivity of these catalysts is maintained as a function of time, and the deactivation rate is low. CO-rich syngas, as produced by advanced generation coal gasifiers, can be accepted directly.

EXAMPLE

Zr(OC₃H₇)₄ was reacted by mixt. with Al₂O₃ in cyclohexane in an inert atmos. until 1 mol. Zr cpd. had deposited by reaction and loss of C₃H₇OH, per Al-OH gp., and the support was then dried in vacuo. The support was then impregnated in several stages by the incipient wetness technique with Ru₃(CO)₁₂ in soln. in hexane, with O₂ and H₂O absent, removing unreacted carbonyl and solvent in vacuo after each stage. When the catalyst after redn. was used as a 12wt.% slurry in oil to convert CO + H₂ (1:1) at

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280°C and 300 psig, there was 22.6% conversion of CO, and the prods. included (wt.%) 35.65 5-11C, 27.0 IC, 22.9 2-4C and 4.5 18C+. (8pp1492RKMHDwgNo0/0)

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