

37084 K/16 E17 H04 SHEL 28.09.81
 SHELL INT RES MIJ BV *DE 3235-428
 28.09.81-FR-018208 (14.04.83) C07c-01/04 C07c-09/02 C07c-11/02

Synthesis gas conversion by catalyst contg. zirconium dioxide - and alkali metal cnd. as promoter gives high yields of butene(s)

C83-036240 Hydrocarbons are prepd. from synthesis gas by passing at high temp. and pressure over a catalyst comprising zirconium dioxide with a cpd., pref. oxide, of alkali metal, pref. K, as promoter. The surface area of the ZrO_2 is pref. 20-500 sq. m./g.

USE/ADVANTAGE

The alkali metal cpd. increases the selectivity of prodn. of C4 hydrocarbons, esp. butenes: e.g. the hydrocarbon prod. from 11% conversion of CO may include 40 wt. % butenes.

DETAILS

In the synthesis gas, the molar ratio $H_2:CO$ is pref. 0.25-6.0: for max. conversion of CO to hydrocarbons, it should be about 1. Reaction is pref. at 200-600 (esp. 300-500) $^{\circ}C$, a pressure of 0.1-1000 (esp. 5-200) bar, and a space velocity of 100-5,000 Nl synthesis gas/l. of catalyst

E(10-J2C3, 10-J2D) H(4-E5, 4-F2E) N(3-B).

020

x h. The catalyst may be as a fixed bed, a fluidised bed or a suspension in a hydrocarbon oil. The catalyst pref. contains 0.05-50 (esp. 0.4-10) wt. % of the alkali metal, and it may be mounted on a support, e.g. Al_2O_3 or SiO_2 . Suitable ZrO_2 is prepd. by slowly adding NH_3 to a soln. of $ZrOCl_2$ in water until the pH is 7-10, filtering off and washing the Zr hydroxide, and calcining it for 1-24 hr. in air at 300-1000 $^{\circ}C$.

EXAMPLE

A catalyst bed comprised 0.4-0.6 mm. particles of ZrO_2 of surface area 122 sq. m./g., contg. 1 wt. % K in the form of K_2O : the ZrO_2 had been calcined for 2 h. at 450 $^{\circ}C$ in air. An equimolar mixt. of CO and H_2 was passed over this bed at 450 $^{\circ}C$, 20 bar absolute and space velocity 1000 Nl/l. x h. The conversion of CO to hydrocarbons was 11%. The hydrocarbon prod. comprised (wt. %): CH_4 , 30; C_2H_6 , 5; C_2H_4 , 8; C_3H_8 , 5; butanes, 12; butenes, 40. (9pp1492).

DE323542B