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Aromatic hydrocarbon(s) prepn. from carbon mon:oxide and hydrogen - on two-component catalyst contg. iron silicate

E(10-J2B3) H(4-E1, 4-E5, 4-F2E) N(2, 2-A, 3-B, 3-D, 3-F)

Prepn. of aromatic hydrocarbons is effected by contacting a mixt. of H_2 + CO with a mixt. of two catalysts, specifically (I) a catalyst for the conversion of the H_2 + CO mixt. into acyclic oxygen-contg. hydrocarbons, and (II) a crystalline Fe silicate which, after calcining for 1 hour in air at 500°C, is stable at above 600°C, has a defined X-ray powder diffraction pattern, and has a SiO_2:Fe_2O_3 molar ratio of > 10.

ADVANTAGES

The catalyst mixt. has high stability and gives less durene in the product.

DETAILS

(I) pref. contains Zn and Cr, esp. contg. 60-80% Zn based on Zn + Cr. The conversion products are partic. methanol and/or dimethyl ether. In (II), the silicate may contain a small amt. of Al, and the alkali metal content is pref. < 0.1 (esp. < 0.05) wt.%. The (I):(II) volume ratio is pref. 1-5:1.

The molar ratio in the H_2 + CO mixt. is pref. 0.25-1.0. Reaction is esp. at 200-500 (300-450)°C and 1-150 (5-100) bars with a GHSV of 50-5000 (300-3000).

The process may be used as the first stage of a 2-stage process in which the prod. from the first stage, contg. H_2, CO and opt. other cpds., is contacted in a second stage with a catalyst for the conversion of H_2 + CO to acrylic hydrocarbons, partic. one contg. Co, Ni or Ru. If the molar ratio of H_2:CO in the feed to the second step is less than 1.5, water is added to the feed and a bifunctional catalyst or a catalyst combination is used for the conversion of a H_2 + CO mixt. to acylic hydrocarbons, and at least the metal component for the conversion of a water + CO mixt. to a H_2+CO_2 mixt. The process may also be used as the first stage in a 3-stage process for the prodn. of middle distillates from a H_2 + CO mixt. The H_2 + CO in the reaction prod. from the first stage, opt. with other cpds., is contacted with a catalyst contg. 100 pts. wt. of silica, 10-40 pts. of Co and 0.25-5 pts. of Zr, Ti or Cr; this catalyst is prepd. by impregnating a silica carrier with aq. soln(s). of salts of Co and Zr, Ti or Cr, and drying and calcining the compsn. If the molar

ratio of H_2:CO in the feed to the second step is less than 1.5, water is added to the feed and the Co catalyst is used with a shift conversion catalyst. In the third stage, at least that part of the reaction prod. from the second stage which has initial b.pt. above the final b.pt. of the heaviest middle distillate required is subjected to catalytic treatment with hydrogen.(18pp510).