

50159 E/24
TEXACO INC

E17

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E(5-G3A, 5-L2, 5-M, 10-A22, 10-E4F, 35-V, 35-X) N(2-B, 2-E, 5)

316

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Alkanol, esp. ethanol, prodn. from synthesis gas - over mixed ruthenium and cobalt catalyst dispersed in molten quat. phosphonium cpd.

concas. are both 0.00001-5 wt.%, with atom ratio 10:1-1:10. The ratio CO:H₂ in the synthesis gas is 1:5-5:1, opt. diluted with argon, N₂, etc. Small amts. of carboxylate esters are formed in the process.

Alkanol prodn. comprises reacting a mixt. of carbon monoxide and hydrogen at ≥ 500 (pref. 2000-9000) psig and ≥ 150 (pref. 150-350)°C, over a catalyst system consisting of (1) a Ru cpd. (I) and (2) a halogen-free Co cpd. (II), dispersed in a low m.pt. quat. phosphonium or ammonium base or salt (III), esp. a tetraalkyl- or mixed alkylaryl phosphonium quat. cpd.

EXAMPLE

4 mmoles each of RuO₂ and Co(acac)₃ were dispersed in 10 g Bu₄NBr, the mixt. transferred to a pressure reactor and brought to 2000 psig with 1:1 CO-H₂. The mixt. was heated at 220°C and 4000 psig for 18 hr., then cooled, and vented. The 38.4 g liq. prod. analysed at (wt.%) ethanol 28.2; methanol 10.2; n-propanol 13.7; methyl acetate 5.9; ethyl acetate 19.9; propyl acetate 9.5; n-butanol 2.0 and water 2.6. After distilling out the alkanols and esters, the catalyst-contg. residue could be reused.(6pp1251).

Specified (III) are tetrabutylphosphonium bromide, chloride, iodide, acetate and chromate, and (I) is esp. RuO₂ or Ru(acac)₃ (acac is acetylacetonate). (II) is pref. Co₂CO₈ Co(acac)₃ or Co(acetate, propionate or acac)₂.

ADVANTAGES

This system gives excellent selectivity for ethanol and good yields.

DETAILS

(III) has m.pt. < 180 (pref. < 150)°C and the mole ratio (I):(III) is 1:0.01-100, esp. 1:0.5-20. Pref. the Ru and Co