

91-297621/41 E17 H04 J04 ESSO 04.04.90
EXXON RES & ENG CO *EP -450-861-A

04.04.90-US-504747 (09.10.91) B01j-23/74 C07c-01/04

Hydrocarbon synthesis, by Fischer-Tropsch, using slurry bubble column - reacts synthesis gas on cobalt catalyst on titania-contg. support for improved productivity

C91-128671 R(BE DE FR GB IT NL)

A hydrocarbon synthesis process comprises reacting H₂ and CO at reaction conditions in a slurry bubble column in the presence of catalyst contg. Co on a TiO₂ support or a titania-contg. support, and obtaining a relative productivity of at least as great as that obtained in a plug flow reactor.

USE/ADVANTAGE

Particularly useful for Fischer-Tropsch synthesis. The process shows the productivity of fixed bed reactors combined with the selectivity of well stirred reactors e.g. CSTR systems i.e. selectivity away from 1C prodn.

SPECIFICALLY CLAIMED

Bubble column peclet no. is at least 3, but not more than 10.

Catalyst contains Re in a ratio Re:CO of at least 0.05:1 (0.1-1:1). Co is present in an amt. of at least 5 wt. %.

E(10-J2D) H(4-E5, 4-F2E) J(4-E1, 4-E4) N(2-B1, 3-E)

Catalyst is slurried in a wax of b.pt over 700 (700-1025) °F.

Wax is prepd. by a hydrocarbon process using Co or Co/Re on a Ti or TiO₂ contg. support.

Reaction is carried out at 190-230°C under a pressure of 80-600 psig (0.5516-4.137 MPa) pref. 150-350 psig and ratio H₂:CO of 1.5-2.5:1.

EXAMPLE

Hydrocarbon synthesis was carried out using a bubble reactor with a Peclet number (length of reactor or catalyst size x gas velocity/dispersion coefficient) of 3-10 at an ave. temp. of 214°C, pressure of 280 psig, H₂/CO feed of 2.02 feed gas rate of 2.1 litres syngas at 60°F/ 1 atmcs/g catalyst-hr. Catalyst contains 12 wt. % Co, 1 wt. % Re.

CO conversion was 81.2%. Product selectivities were 1C 3.2, 2C-4, 2.7, 5C+93.9. Productivity was 0.0420.

A fixed bed run (Peclet number = well over 10), at 214°C 280 psig, feed gas rate of 0.909, H₂/CO 2.07 gave productivity 0.0110 (by used catalyst) CO conversion was 89.6%, selectivity: 5C^{*} 89, 1C 7.03.

A CSTR run (Peclet no. = about 0) at 210°C, 280 psig, feed gas rate of 1.360, H₂/CO = 2.1 gave productivity of 0.0090, CO conversion of 47.9%, selectivity 5C+ 91.9, 1C 4. (15pp2116SLDwgNo0/2)
(E) ISR: No Search Report.