22604 K/09 E17 H04 J04 STAH 21.12.81
STANDARD OIL CO (OHIO) *ZA 8108-820
21.12.81-ZA-008820 (04.11.82) B01;
E(10-J2D) H(4-E4, 4-E5, 4-F2E, 9-D) J(4-E4) N(2, 3)
356

Gp/VIII metal catalyst for methane synthesis - based on support with specified pore structure

C83-022080 Particulate free-flowing fluidised-bed catalysts comprise (a) a porous support with a surface area of more than 1 to less than 350 m^2/g. and a pore vol. of 0.4-3.0 cc/g., and (b) one or more Group VIII metals on the pore surfaces of the support, the metal(s) being present in an amt. equiv. to at least one atomic layer.

USES/ADVANTAGES

The catalysts can be used for methane synthesis in a cyclic process in which C is deposited by disproportionation of CO and the C is reacted with H_2 or steam to form CH_4. They have high activity for both reactions, can withstand repeated cycling without significant attrition or loss of activity, are readily fluidised in conventional reactors, and exhibit little or no growth of surface C fibres (see also BE-869185).

DETAILS

The support is pref. silica with a surface area of 6-250 m^2/g. and a pore vol. of 1-2 cc/g., esp. with no measurable pores having a dia. of less than 50 Angstroms. Specified Group VIII metals are Fe, Co and Ni (esp. Fe).

The catalyst pref. has a particle size distribution such that 80% of the particles are 5-300 μ in size, and a density such that the catalyst will form a fluidised bed at an upflow gas velocity of 0.1-10 ft./sec.

EXAMPLE

A soln. of 46.7g. $Fe(NO_3)_3.9H_2O$ in 20 ml. H_2O was added dropwise with stirring to 31.7g. of hydrothermally treated SiO_2 with a surface area of 53 m^2/g. and a pore vol. of 1.22 cc/g. The mixt. was dried overnight at 110°C, calcined in air at 150°C for 30 min. and at 400°C for 6 hr., and reduced by fluidising in H_2 at 550°C for 90 min. and at 650°C for 30 min.(22pp367).

(Additionally Classified in Section E).

ZA8108820