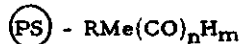


77779 D/42 A97 H04 J04 (A13) USAT 17.05.79  
 US DEPT OF ENERGY \*US 4292-415  
 29.04.80-US-145187 (+039986) (29.09.81) C06f-08/18

Polystyrene-bonded cyclo-alkadienyl metal complexes prodn. - from crosslinked polystyrene; used as Fischer Tropsch catalyst, have high methanation activity

Div.ex. 4230633 (82471C).

Prepn. of polystyrene-supported cycloalkadienyl metal complexes (I) of the formula



(where PS is a macroporous polystyrene resin crosslinked with > 1 (esp.3)% divinylbenzene and having a pore size of 100-900 Å; R is 4-6C cycloalkadienyl (esp. cyclopentadienyl); Me is a gp. VIII metal (esp. Co); n is 0-3; and m is 0-2; with the proviso that 2n+m+x is 18, where x is the no. of electrons in R and M, or that n+m is 0) comprises (a) brominating (PS)-H; (b) treating the obtained (PS)-Br with a Li 1-12C alkyl in an aromatic solvent; (c) substituting the resulting (PS)-Li by reaction with a 4-6C 2-cycloalkenone in ether solvent and using a water work-up to form a cycloalkenyl alcohol-substd. (PS); (d) dehydrating the

A(4-B10, 4-C4, 10-E1, 12-S1, 12-W11B) H(4-F2E) J(4-E4) N(5-B)

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latter; and (e) reacting with metal carbonyl in the presence of a halogenated hydrocarbon, a 6-8C aromatic hydrocarbon, an ether or a 4-10C ester.

The parent patent claimed a Fischer-Tropsch process using (i) as catalyst.

USE/ADVANTAGE

(I) have high methanation activity under mild conditions, can be readily suspended in hydrocarbon solvents, are stable in the absence of air and moisture, and can be readily regenerated. (7 pp959).

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| <p>53418 D/29      A97 H04 J04 (A13)      USAT 17.05.79<br/>         US DEPT OF ENERGY      *US 4276-395<br/>         29.04.80-US-145188 (+039986) (30.06.81) C08f-210 C08f-212<br/>         Polystyrene-supported metal complexes - useful as Fischer-Tropsch catalysts</p>   | <p>A(10-E3, 10-E22, 12-W11B) H(4-E5, 4-F2E) J(4-E4) N(2-E, 2-F, 5-B, 5-E)      589</p> |
| <p>Div. ex. 4230633 (82471C).</p> <p>New polymer-supported metal complexes, esp. useful as Fischer-Tropsch catalysts, are of formula <math>PS-R-M(CO)_nH_m</math> (where PS is a macroporous divinylbenzene-crosslinked polystyrene resin with a divinylbenzene content of more than 1% but less than 18% and a pore size of 100-900 Angstroms; R is a 4-6C cycloalkadienyl radical; M is a Group VIII metal, esp. Co or Rh; n 0-3; m 0-2; with the proviso that <math>2n+m+x=18</math>, where x is the no. of electrons in R and M, or that <math>n+m=0</math>).</p> <p>The parent patent (82471C) claimed Fischer-Tropsch processes using the supported metal complexes as catalysts (7pp367).</p> | <p>US4276395</p>   |

82471 C/46 A97 H04 J04 (A13) USAT 17.05.79  
 US DEPT OF ENERGY \*US 4230-633  
 17.05.79-US-039986 (28.10.80) C07c-27/06  
 Low-temp. Fischer-Tropsch hydrocarbon synthesis - using polystyrene-bonded cyclo-alkadienyl metal complex as catalyst

A Fischer-Tropsch process comprises contacting CO and H<sub>2</sub> with a resin-bonded metal complex catalyst (I) at 100-250°C. and  $\geq 40$  psi, (I) having the formula

(PS)-RM(CO)<sub>n</sub>H<sub>m</sub> (where PS is a macroporous polystyrene resin crosslinked with  $> 1\%$  divinylbenzene; R is a 4-6C cycloalkadienyl radical; M is a Group VIII metal; n = 0-3; and m = 0-2; with the proviso that  $2n + m + x = 18$ , where x is the no. of electrons in R and M, or that  $n \div m = 0$ ).

#### ADVANTAGES

(I) have high methanation activity under mild conditions, can be readily suspended in hydrocarbon solvents, are stable in the absence of air and moisture, and can readily be regenerated.

#### WIDER DISCLOSURES

(I) are disclosed to be novel.

#### DETAILS

A(10-E22, 12-W11B) H(4-E5, 4-F2E) J(4-E1, 4-E4) N(5-B).

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Prefd. (I) are those where PS contains 3 wt. % divinylbenzene and has a pore size of 100-900 Å, R is cyclopentadienyl, and M is Co. They can be prepd. by brominating PS, liberating the product, reacting with a 4-6C 2-cycloalkenone, reacting with the corresp. metal carbonyl, and opt. decarbonylating the product.

The Fischer-Tropsch synthesis is pref. effected at 150-250 (esp. 150-200)°C. and 75-2000 (esp. 75-250) psi. (7pp367).