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(54) Title: PRODUCTION OF HYDROCARBONS FROM A SYNTHESIS GAS

(57) Abstract: A method of treating an untreated catalyst support includes contacting an untreated catalyst support which is partially soluble in an aqueous acid and/or a neutral aqueous solution with a modifying component precursor of the formula Me(OR)<sub>x</sub> where Me is a modifying component selected from Si, Zr, Ti, Cu, Zn, Mn, Ba, Co, Ni, Na, K, Ca, Sn, Cr, Fe, Li, Tl, Mg, Sr, Ga, Sb, V, Hf, Th, Ce, Ge, U, Nb, Ta, and W, R is an alkyl or acyl group, and x is an integer having a value of from 1 to 5. The modifying component is thereby introduced onto and/or into the catalyst support to form a protected modified catalyst support which is less soluble in the aqueous acid and/or the neutral aqueous solution. No calcination of the protected modified catalyst support is effected.

INTERNATIONAL SEARCH REPORT

International Application No  
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 B01J37/02 B01J21/04 B01J21/06 B01J23/02 C10G2/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 B01J		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 99 42214 A (SASOL CHEMICALS EUROP LTD ;BERGE PETER JACOBUS VAN (ZA); LOOSDRECH) 26 August 1999 (1999-08-26) cited in the application	1-16, 20-29
Y	page 1 -page 12; claims 1,2,4-6,8,10,12,14,16	17-19
Y	WO 97 33690 A (HOECHST CELANESE CORP) 18 September 1997 (1997-09-18) page 6, line 13 - line 21	17-19
X	US 3 274 120 A (AFTANDILIAN VICTOR D) 20 September 1966 (1966-09-20)	1-3,5
Y	the whole document	9,10
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<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
° Special categories of cited documents :		
*A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed		*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *&* document member of the same patent family
Date of the actual completion of the international search  <p style="text-align: center;">24 June 2002</p>		Date of mailing of the international search report  <p style="text-align: center;">04/07/2002</p>
Name and mailing address of the ISA European Patent Office, P.B. 5618 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016		Authorized officer  <p style="text-align: center;">Deurinck, P</p>

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	US 4 547 283 A (NEEL EMMANUEL E A ET AL) 15 October 1985 (1985-10-15) the whole document	9, 10 1, 4, 16, 20, 23, 24
X A	US 4 748 145 A (GARROU PHILIP E ET AL) 31 May 1988 (1988-05-31) column 3, line 34 - column 7, line 53 column 17, line 45 - line 63; claims 1-4, 8, 9	1, 4, 5 9-11, 16, 20-25

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB 01/01310

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9942214	A	26-08-1999	AU 745771 B2 28-03-2002
			AU 2630299 A 06-09-1999
			BR 9908011 A 31-10-2000
			CA 2320914 A1 26-08-1999
			CN 1291116 T 11-04-2001
			EP 1058580 A1 13-12-2000
			GB 2352194 A , B 24-01-2001
			WO 9942214 A1 26-08-1999
			JP 2002503546 T 05-02-2002
			NO 20004147 A 19-10-2000
			PL 342737 A1 02-07-2001
			ZA 9901265 A 28-11-2000
			WO 9733690
CA 2244909 A1 18-09-1997			
CZ 9802923 A3 17-03-1999			
EP 0888183 A1 07-01-1999			
JP 2000506438 T 30-05-2000			
WO 9733690 A1 18-09-1997			
US 3274120	A	20-09-1966	NONE
US 4547283	A	15-10-1985	FR 2553430 A1 19-04-1985
			AU 577322 B2 22-09-1988
			AU 3411984 A 18-04-1985
			CA 1248899 A1 17-01-1989
			DE 3479429 D1 21-09-1989
			EP 0145042 A2 19-06-1985
			JP 60133089 A 16-07-1985
			ZA 8407939 A 29-05-1985
US 4748145	A	31-05-1988	US 4686314 A 11-08-1987
			US 4559364 A 17-12-1985