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(54) Title: HYDROCARBON CONVERSION PROCESS USING NANOSIZED PARTICLES

(57) Abstract: Hydrocarbon conversion process comprising the steps of (a) suspending catalyst particles comprising a layered material in a first, polar hydrocarbon, employing conditions such as will cause delamination of the layered material to form a suspension comprising particles with a size of less than 1 micron, (b) optionally adding the suspension to a second hydrocarbon, (c) converting the first and/or the optional second hydrocarbon in the presence of said delaminated layered material, and (d) separating the delaminated material from the first and the optional second hydrocarbon. This process provides an economically desired way of converting hydrocarbons using small catalyst particles.

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 B01J C10G C08F

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, API Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 359 842 A (UNION CARBIDE CORPORATION) 28 March 1990 (1990-03-28) claim 1 page 3, lines 32-34 page 3, line 52 - page 4, line 2 page 16, lines 45-52 page 17, lines 19,20 page 18, lines 1-12,42-57 page 19, lines 39,40 page 20, line 51 - page 21, line 13	1,3-6
X	US 4 775 461 A (HARRIS ET AL) 4 October 1988 (1988-10-04) column 1, lines 41-57 column 3, lines 6-34 column 7, line 52 - column 8, line 3 ----- -/--	1-4,6

Further documents are listed in the continuation of Box C. See patent family annex.

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<p>*A* document defining the general state of the art which is not considered to be of particular relevance</p> <p>*E* earlier document but published on or after the international filing date</p> <p>*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)</p> <p>*O* document referring to an oral disclosure, use, exhibition or other means</p> <p>*P* document published prior to the international filing date but later than the priority date claimed</p>	<p>*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</p> <p>*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</p> <p>*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.</p> <p>*Z* document member of the same patent family</p>
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Date of the actual completion of the international search 14 October 2005	Date of mailing of the international search report 24/05/2006
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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.
X	US 5 917 069 A (BUCKL ET AL) 29 June 1999 (1999-06-29) claims 1,2,6; examples 2,3 -----	1,6
A	US 4 844 790 A (OCCELLI ET AL) 4 July 1989 (1989-07-04) figures 1A,1B column 1, lines 11-15 column 2, lines 28-39 column 4, lines 25-32 column 9, lines 5-18 -----	1-6
A	US 3 974 062 A (OWEN ET AL) 10 August 1976 (1976-08-10) column 6, lines 31-60 -----	1-6
A	US 5 288 739 A (DEMME ET AL) 22 February 1994 (1994-02-22) column 21, lines 38-54 -----	1-6

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No PCT/EP2005/054180

Patent document cited in search report	A	Publication date	Patent family member(s)	Publication date
EP 0359842	A	28-03-1990	US 4814541 A	21-03-1989
US 4775461	A	04-10-1988	NONE	
US 5917069	A	29-06-1999	DE 19505579 A1 WO 9626005 A1 EP 0809532 A1 JP 11500352 T	22-08-1996 29-08-1996 03-12-1997 12-01-1999
US 4844790	A	04-07-1989	NONE	
US 3974062	A	10-08-1976	NONE	
US 5288739	A	22-02-1994	NONE	