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Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))
- of inventorship (Rule 4.17(iv))

Published:

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- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

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16 June 2011

(54) Title: IMPROVED METHOD FOR REMOVING METALS AND AMINES FROM CRUDE OIL

(57) Abstract: A method of removing metals and amines from crude oil comprising adding an effective metal removing amount of one or more hydroxycarboxylic acids selected from lactic acid and malic acid and salts thereof to said crude oil; adding wash water to said crude oil; mixing said crude oil, acid and wash water to form an emulsion; and resolving said emulsion into an aqueous phase and crude oil having a reduced metals content



WO 2011/035085 A3

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2010/049211**A. CLASSIFICATION OF SUBJECT MATTER***C10G 17/02(2006.01)i, B01J 31/04(2006.01)i, B01J 31/26(2006.01)i*

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)

C10G, 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 practicable, search terms used)
eKOMPASS(KIPO internal) & Keywords: (lactic, malic, hydroxy acid, hydroxycarboxylic acid) <and> (calcium, amine*, iron*) <and> (hydrocarbon, fuel, oil) <and> (refine*, demetal*, remov*, captur*, emulsi*)**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2004-0045875 A1 (NGUYEN et al.) 11 March 2004 See claims 1-20; [0034] - [0038]; tables III and VI	1-15
Y	US 4789463 A1 (REYNOLDS) 06 December 1988 See column 2, line 66 - column 3 line 37; claims 1-13	1-15
A	US 4439345 A1 (DUKE) 27 March 1984 See abstract; column 4, line 55-61; column 6, line 25-34; claims 1-9	1-15
A	US 4888108 A1 (FARNAND) 19 December 1989 See abstract; claims 1, 6, 11	1-15

 Further documents are listed in the continuation of Box C. See patent family 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 application or patent but published on or after the international filing date

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"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

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Date of mailing of the international search report

27 APRIL 2011 (27.04.2011)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004-0045875 A1	11.03.2004	AU 2003-268267 A1 CA 2495087 A1 CN 101081996 A0 CN 1678716 A EP 1530620 A1 EP 2287272 A1 GB 0428415 D0 GB 2405412 A GB 2405412 B JP 2005-537351 A JP 2009-235411 A JP 2009-235412 A JP 4350039 B2 KR 10-2005-0083663A US 2005-0241997 A1 US 2009-152164 A1 US 7497943 B2 US 7799213 B2 WO 2004-020553 A1 WO 2004-020553 A8	19.03.2004 11.03.2004 05.12.2007 05.10.2005 18.05.2005 23.02.2011 02.02.2005 02.03.2005 08.03.2006 08.12.2005 15.10.2009 15.10.2009 21.10.2009 26.08.2005 03.11.2005 18.06.2009 03.03.2009 21.09.2010 11.03.2004 29.04.2004
US 4789463 A1	06.12.1988	None	
US 4439345 A1	27.03.1984	None	
US 4888108 A1	19.12.1989	None	