

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 December 2009 (10.12.2009)

PCT

(10) International Publication Number
WO 2009/148979 A3

(51) International Patent Classification:

B01F 17/00 (2006.01) **B01D 17/04** (2006.01)
C10G 33/04 (2006.01)

(21) International Application Number:

PCT/US2009/045758

(22) International Filing Date:

30 May 2009 (30.05.2009)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

12/132,842 4 June 2008 (04.06.2008) US

(71) Applicant (for all designated States except US): **NALCO COMPANY** [US/US]; 1601 W. Diehl Road, Naperville, IL 60563-1198 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **WILLIAMS, Duncan, E.** [GB/CA]; 701, 205 Riverfront Ave. SW, Calgary, AB T2P 5K4 (CA). **MGLA, Richard** [CA/CA]; 32 Woodacres Place S.W., Calgary, AB T2W 4W1 (CA).

(74) Agents: **YONTER, Edward, O.** et al.; Nalco Company, 1601 W. Diehl Road, Naperville, IL 60563-1198 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR,

KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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:

- with international search report (Art. 21(3))
- 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))

(88) Date of publication of the international search report:

25 February 2010

(54) Title: ANHYDRIDE DEMULSIFIER FORMULATIONS FOR RESOLVING EMULSIONS OF WATER AND OIL

(57) Abstract: The present invention includes the use of anhydride compositions, including alkyl and aryl anhydrides, for use as a demulsifier in resolving emulsions of water and oil. In particular, the anhydride composition can be used alone or in a blend with other demulsifiers. Suitable anhydrides suitable for the present invention include acetic and propionic, with acetic anhydride being preferred. The anhydride composition can be added directly to crude oil or other compositions to be resolved. As such, the demulsifier composition includes an anhydride, such as acetic anhydride, alone or in combination with other demulsifiers. The anhydride can be used in an amount ranging between trace and 100% by weight of the demulsifier composition.



WO 2009/148979 A3

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/045758

A. CLASSIFICATION OF SUBJECT MATTER

INV. B01F17/00 C10G33/04 B01D17/04

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)
B01D

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 96/00766 A1 (EXXON RESEARCH ENGINEERING CO [US]; BRIFFETT NEIL EDWARD [GB]) 11 January 1996 (1996-01-11) page 7, line 27 - page 8, line 31; claims 1,6,10	1-15
X	US 1 596 589 A (DE GROOTE MELVIN) 17 August 1926 (1926-08-17) page 2, line 3 - line 7; claim 1	1-15
X	US 4 098 692 A (BAKER ALAN STUART ET AL) 4 July 1978 (1978-07-04) column 4, line 35 - line 48; claims 1,2; table 1	1-15
X	US 2003/182848 A1 (COLLIER PHILIP E [GB] ET AL) 2 October 2003 (2003-10-02) paragraph [0098]; claim 1	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 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

11 December 2009

Date of mailing of the international search report

18/12/2009

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Deurinck, Patricia

INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/045758

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of documents with indication, where appropriate, of the relevant passages	Relevant to claim No. -
X	US 1 659 996 A (DE GROOTE MELVIN ET AL) 21 February 1928 (1928-02-21) page 2, line 53 - line 79; claim 1 -----	1-15
X	US 2007/062849 A1 (LUO LAILONG [CN] ET AL) 22 March 2007 (2007-03-22) claims 1,2,4; examples 1-14 -----	1-12
X	GB 834 767 A (NAT ALUMINATE CORP) 11 May 1960 (1960-05-11) page 1, line 63 - page 2, line 81 page 3, line 81 - line 101; claims 1,6 -----	1-12
X	US 2005/288380 A1 (MACPHERSON IAN [US] ET AL) 29 December 2005 (2005-12-29) claim 1 -----	1-12

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/045758

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
WO 9600766	A1	11-01-1996	CA 2193256 A1 DE 69518325 D1 DE 69518325 T2 EP 0767823 A1 JP 10512301 T US 5753598 A	11-01-1996 14-09-2000 18-01-2001 16-04-1997 24-11-1998 19-05-1998
US 1596589	A	17-08-1926	NONE	
US 4098692	A	04-07-1978	CA 1087481 A1 GB 1567310 A	14-10-1980 14-05-1980
US 2003182848	A1	02-10-2003	CA 2421889 A1 JP 2003268393 A US 2006230672 A1	13-09-2003 25-09-2003 19-10-2006
US 1659996	A	21-02-1928	NONE	
US 2007062849	A1	22-03-2007	AP 1835 A CN 1454969 A WO 2005005579 A1 RU 2340652 C2	20-03-2008 12-11-2003 20-01-2005 10-12-2008
GB 834767	A	11-05-1960	NONE	
US 2005288380	A1	29-12-2005	AU 2005202493 A1 CN 1714921 A JP 2006007212 A KR 20060048672 A SG 118402 A1	12-01-2006 04-01-2006 12-01-2006 18-05-2006 27-01-2006