

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
25 January 2007 (25.01.2007)

PCT

(10) International Publication Number
WO 2007/011998 A3

(51) International Patent Classification:
C07F 9/02 (2006.01)

(21) International Application Number:
PCT/US2006/028011

(22) International Filing Date: 19 July 2006 (19.07.2006)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
60/700,581 19 July 2005 (19.07.2005) US
60/747,892 22 May 2006 (22.05.2006) US
11/458,274 18 July 2006 (18.07.2006) US

(71) Applicant (*for all designated States except US*): **TRITON SYSTEMS, INC.** [US/US]; 200 Turnpike Road, Chelmsford, Massachusetts 01824 (US).

(72) Inventor; and

(75) Inventor/Applicant (*for US only*): **FREITAG, Dieter** [DE/US]; 181 Littleton Road, Suite 409, Chelmsford, Massachusetts 01824 (US).

(74) Agent: **MILLER, Raymond, A.**; Pepper Hamilton LLP, One Mellon Center, 50th Floor, 500 Grant Street, Pittsburgh, Pennsylvania 15219 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, 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, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

(88) Date of publication of the international search report:
23 April 2009

(54) Title: DIARYL ALKYLPHOSPHONATES AND METHOD FOR PREPARING SAME

(57) Abstract: A method of making optionally substituted diaryl alkylphosphonates from an optionally substituted arylol, an optionally substituted alkanol, and a phosphorous trihalide is described.



WO 2007/011998 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 06/28011

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) - C07F 9/02 (2007.01)

USPC -558/70, 91

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)

USPC -558/70, 91

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC -558/70, 91 and all other relevant data bases (text search - see terms below)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WEST (PGPB,USPT,USOC,EPAB,JPAB); Google

Search Terms: phosphorus trihalide, optionally substituted, alkanol, diaryl alkylphosphonate

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 4,736,052 A (Nunan et al.) 05 April 1988 (05.04.1988) col 1, ln 11-38; col 2, ln 5 to col 4, ln 40	1-48
Y	US 5,254,709 A (Hunter) 19 October 1993 (19.10.1993) Table I; col 1, ln 18-23; col 6, ln 61; col 7, ln 20 to col 14, ln 64	1-48

☐ Further documents are listed in the continuation of Box C.

* 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

"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

25 June 2007 (25.06.2007)

Date of mailing of the international search report

17 JAN 2008

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US, Commissioner for Patents
P.O. Box 1450, Alexandria, Virginia 22313-1450
Facsimile No. 571-273-3201

Authorized officer:

Lee W. Young

PCT Helpdesk: 571-272-4300

PCT OSP: 571-272-7774