



(51) International Patent Classification:

C07D 493/04 (2006.01) *C07D 405/12* (2006.01)
C07D 405/14 (2006.01) *C08G 59/44* (2006.01)

(21) International Application Number:

PCT/US2012/043867

(22) International Filing Date:

22 June 2012 (22.06.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

13/168,024 24 June 2011 (24.06.2011) US

(71) Applicant (for all designated States except US): **E. I. DU PONT DE NEMOURS AND COMPANY** [US/US];
1007 Market Street, Wilmington, Delaware 19899 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ZAHR, George Elias** [US/US]; 210 Sunset View Drive, Glen Mills, Pennsylvania 19342 (US).(74) Agent: **LANGWORTHY, John A.**; E. I. du Pont de Nemours and Company, Legal Patent Records Center, 4417 Lancaster Pike, Wilmington, Delaware 19805 (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, CL, 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, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, 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, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, 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, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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:

4 April 2013

(54) Title: DI-ISOIMIDE COMPOUNDS, COMPOSITIONS, AND PREPARATION THEREOF

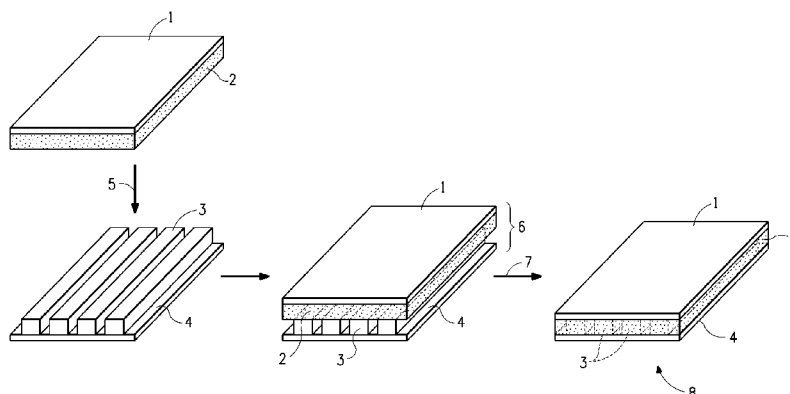


FIG. 1

(57) **Abstract:** The present invention deals with a novel aromatic di-isoimide compound that has utility as a catalyst and as a curing agent in epoxy compositions. The di-isoimide serves effectively as a thermally activated latent catalyst in epoxy curing, thereby increasing shelf life, and avoids premature cross-linking. Embodiments of useful compositions comprising the novel di-isoimide, as well as a method of preparing the compound are provided herein. The preparation of novel laminated articles and printed wiring boards, including encapsulated printed wiring boards, are also disclosed. The inventive compound described herein can also be used as a flame retardant in thermoplastic and thermoset polymers.



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2012/043867**A. CLASSIFICATION OF SUBJECT MATTER***C07D 493/04(2006.01)i, C07D 405/14(2006.01)i, C07D 405/12(2006.01)i, C08G 59/44(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)

C07D 493/04; C08G 73/06; C08L 61/00; C08L 101/00; C08L 77/02; C08G 73/10; C08F 283/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: epoxy curing, isoimide, PMDA, pyromellitic dianhydride, melamine

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 04393181A (ALLEN,R.A.) 12 July 1983 See the whole document.	1-18
A	US 03242142A (HYDE,T.J.) 22 March 1966 See the whole document.	1-18
A	US 03459566A (WILSON,B.S.Jr.& VON DOENHOFF,C.) 5 August 1969 See the whole document.	1-18
A	US 04485231A (LANDIS,A.L.) 27 November 1984 See example 13.	1-18
A	EP 0408166 A2 (GENCORP INC.) 16 January 1991 See claim 12.	1-18

☐ 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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of 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

29 JANUARY 2013 (29.01.2013)

Date of mailing of the international search report

30 JANUARY 2013 (30.01.2013)

Name and mailing address of the ISA/KR

Korean Intellectual Property Office
189 Cheongsu-ro, Seo-gu, Daejeon Metropolitan
City, 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

Lee Ye Rie

Telephone No. 82-42-481-8737



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2012/043867

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 04393181A	12.07.1983	EP 0097979 A2 EP 0097979 A3 EP 0097979 B1 JP 59-013768 A	11.01.1984 02.01.1985 30.09.1987 24.01.1984
US 03242142A	22.03.1966	None	
US 03459566A	05.08.1969	DE1646455 A1 GB1170911 A	01.07.1971 19.11.1969
US 04485231A	27.11.1984	EP 0071372 A1 EP 0071372 B1 JP 03-027573 B JP 03-027574 B JP 03-060830 B JP 1665216 C JP 1665217 C JP 1702777 C JP 58-024579 A JP 63-118329 A JP 63-118330 A KR 10-1989-0002775 B1 US 04438273A A	09.02.1983 22.01.1986 16.04.1991 16.04.1991 17.09.1991 19.05.1992 19.05.1992 14.10.1992 14.02.1983 23.05.1988 23.05.1988 28.07.1989 20.03.1984
EP 0408166 A2	16.01.1991	CA 2005193 A1 EP 0408166 A3 JP 03-051118 A US 05068292A US 05223584A US 05223588A	11.01.1991 03.07.1991 05.03.1991 26.11.1991 29.06.1993 29.06.1993