



(51) International Patent Classification:

C09K 11/06 (2006.01) **C08G 61/02** (2006.01)
H05B 33/14 (2006.01)

(21) International Application Number:

PCT/GB20 12/05 1445

(22) International Filing Date:

21 June 2012 (21.06.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

1110564.0 22 June 2011 (22.06.2011) GB

(71) Applicants (for all designated States except US): **CAM-
BRIDGE DISPLAY TECHNOLOGY LIMITED**
[GB/GB]; Building 2020, Cambourne Business Park, Cam-
bridge, Cambridgeshire CB23 6DW (GB). **SUMITOMO**
CHEMICAL COMPANY LIMITED [JP/JP]; 27-1
Shinkawa 2-chome, Chuo-Ku, Tokyo 104-8260 (JP).

(72) Inventor; and

(75) Inventor/Applicant (for US only): **ZUBERI, Tania**
[GB/GB]; c/o Cambridge Display Technology Limited,
Building 2020, Cambourne Business Park, Cambridge,
Cambridgeshire CB23 6DW (GB).

(74) Agents: **GILANI, Anwar** et al; Cairington House, 126-
130 Regent Street, London, Greater London W1B 5SE
(GB).

(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:

6 June 2013

(54) Title: POLYMER AND OPTOELECTRONIC DEVICE

(57) Abstract: A polymer comprising a repeat unit of formula (X): wherein R¹⁰ in each occurrence represents H or a substituent; Sp²
represents a spacer group; t is 0 or 1; and POZ represents an optionally substituted, optionally fused phenoxazine group.



INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051445

A. CLASSIFICATION OF SUBJECT MATTER
INV. C09K11/06 H05B33/14 C08G61/02
ADD.

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)
C09K H05B C08G

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)

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	Yu Shu-Yan: "Vinyl Monomers Bearing Chromophore Moieties and Their Polymers. VI. Synthesis and Photochemical Behavior of Acrylic Monomer Bearing Phenoxazine Moiety and Its Polymer" , Journal of Applied Polymer Science, 7 December 1998 (1998-12-07) , pages 481-489, XPQ55036124, DOI : 10.1002/(SICI)1097-4628(19970718)65:3<481::AID-APP7>3.0.CO;2-D Retrievd from the Internet: URL:http://onlinelibrary.wiley.com/store/10.1002/(SICI)1097-4628(19970718)65:3<481::AID-APP7>3.0.CO;2-D/asset/7ftp.pdf?v=1&t=h66jb71a&s=2e2363d6841947ce364c743552d0ad7le406aca6 [retrieved on 2012-08-22] compound P(AP0) -/--	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 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

23 August 2012

Date of mailing of the international search report

08/04/2013

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

Ziegler, Jan

INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2012/051445

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	figure 2 page 482 - page 484 the whole document ----- ZHANG X ET AL: "Donor/acceptor vinyl monomers and their polymers: Synthesis, photochemical and photophysical behavior", PROGRESS IN POLYMER SCIENCE, PERGAMON PRESS, OXFORD, GB, vol . 31, no. 10, 1 October 2006 (2006-10-01) , pages 893-948, XP027932382 , ISSN: 0079-6700 [retrieved on 2006-10-01] compounds 15,16 paragraph [2.2. 1.2] - paragraph [2.2 ,1.5] the whole document -----	1-18
X	US 2010/301310 A1 (NOGUCHI TAKANOBU [JP] ET AL) 2 December 2010 (2010-12-02) repeat unit c; page 42 the whole document -----	1-18
X	GB 2 452 359 A (SUMITOMO CHEMICAL co [JP]) 4 March 2009 (2009-03-04) example 1 claim 1 page 123 compound repeat unit c the whole document -----	1-18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2012/051445

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fees, this Authority did not invite payment of additional fees.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos. :

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-18

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-18

polymer comprising the repeat unit of formula (X), an organic electronic device comprising said polymer and a composition comprising said polymer.

2. claims: 19-47

polymer comprising a first and a second repeat unit, wherein - the first repeat unit comprises a first backbone, a first charge-transporting group, a first spacer group comprising at least four non-ring atoms and wherein - the second repeat unit comprises a second backbone, a cross-linkable group pendant from the second backbone, a second spacer group. A composition comprising said polymer. A method of forming said polymer. A device comprising said polymer. A method of forming a device comprising said polymer.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2012/05 1445

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010301310 AI	02-12-2010	NON E	

GB 2452359 A	04-03-2009	CN 101326214 A	17-12-2008
		DE 112006002642 T5	21-08-2008
		GB 2452359 A	04-03-2009
		KR 20080051163 A	10-06-2008
		WO 2007043439 AI	19-04-2007
