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(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, 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.

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**Declarations under Rule 4.17:**

— 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:  
8 July 2010

(54) Title: PRINTABLE LIGHT-EMITTING COMPOSITIONS

(57) Abstract: Disclosed herein are compositions comprising an electron transport compound, an emissive compound, and an organic solvent. The emissive compound comprises an organic indium complex attached to a nanoparticle core. These compositions are useful in fabricating light emitting devices and can be deposited on a substrate via a printing process.



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# INTERNATIONAL SEARCH REPORT

International application No  
PCT/US2009/060555

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. C09K11/06      H01L51/50      H05B33/14 ADD.		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) C09K H01L H05B		
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		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CHEN K B ET AL: "Novel dendritic light-emitting materials containing polyhedral oligomeric silsesquioxanes core" THIN SOLID FILMS, ELSEVIER-SEQUOIA S.A. LAUSANNE, CH, vol. 514, no. 1-2, 30 August 2006 (2006-08-30), pages 103-109, XP025005888 ISSN: 0040-6090 [retrieved on 2006-08-30]	1,5-10
Y	the whole document  ----- -/--	2-4, 11-29, 44
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C. <span style="margin-left: 200px;"><input checked="" type="checkbox"/> See patent family annex.</span>		
* 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	Date of mailing of the international search report	
22 April 2010	12/05/2010	
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  Nemes, Csaba A.	

## INTERNATIONAL SEARCH REPORT

International application No

PCT/US2009/060555

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>WO 02/05971 A1 (CANON KK [JP]; SELLINGER ALAN [US]; LAINE RICHARD M [US])  24 January 2002 (2002-01-24)  * page 10, line 19 through page 13, line 5, page 15, compound 3, lines 3 to 11, page 16, line 18 through page 17, line 12  *</p>	2-4, 11-29,44
A	<p>WO 2005/037955 A1 (NITTO DENKO CORP [JP]; CAMMACK J KEVIN [US]; JABBOUR GHASSAN [US]; LI) 28 April 2005 (2005-04-28)  the whole document</p>	1-29,44
A	<p>WO 2004/060898 A1 (AGENCY SCIENCE TECH &amp; RES [SG]; HE CHAOBIN [CN]; XIAO YANG [SG]; HUANG) 22 July 2004 (2004-07-22)  the whole document</p>	1-29,44
A	<p>JIANG C ET AL: "HIGH-EFFICIENCY, SATURATED RED-PHOSPHORESCENT POLYMER LIGHT-EMITTING DIODES BASED ON CONJUGATED AND NON-CONJUGATED POLYMERS DOPED WITH AN IR COMPLEX"  ADVANCED MATERIALS, WILEY VCH VERLAG, DE LNKD- DOI:10.1002/ADMA.200306331, vol. 16, no. 6, 8 March 2004 (2004-03-08), pages 537-541, XP002317428  ISSN: 0935-9648  the whole document</p>	1-29,44
X,P	<p>WO 2009/006550 A1 (NITTO DENKO CORP [JP]; CHAE HYUN SIK [US]; OHMORI YUTAKA [JP]; FROEHLI) 8 January 2009 (2009-01-08)  the whole document</p>	1-29,44

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2009/060555

## 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.:  
  
1-29(completely); 44(partially)
  
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.:

### 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: 1-11(completely); 44(partially)

A composition comprising an electron transport compound, an emissive compound and an organic solvent, wherein the emissive compound is represented by formula (I).

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2. claims: 12-29(completely); 44(partially)

A composition comprising an electron transport compound, an emissive compound and an organic solvent, wherein the emissive compound is represented by formula (II) or (III).

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3. claims: 30-35(completely); 44(partially)

A composition comprising an electron transport compound, an emissive compound and an organic solvent, wherein the emissive compound is represented by formula (IV).

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4. claims: 36-43(completely); 44(partially)

A composition comprising an electron transport compound, an emissive compound and an organic solvent, wherein the emissive compound is represented by formula (V).

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2009/060555

Patent document cited in search report	Publication date	Patent family member(s)	Publication date	
WO 0205971	A1	24-01-2002	JP 3880518 B2	14-02-2007
			JP 2004506050 T	26-02-2004
			TW 245793 B	21-12-2005
			US 6517958 B1	11-02-2003
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WO 2005037955	A1	28-04-2005	NONE	
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