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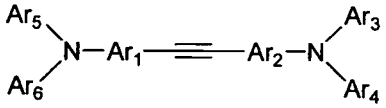
(54) Novel organic electroluminescent compounds and organic electroluminescent device using the same

(57) The present invention relates to novel organic electroluminescent compounds, and organic electroluminescent devices employing the same as electroluminescent material. Specifically, the organic electroluminescent compounds according to the invention are **characterized in that** they are represented by Chemical Formula (1):



Since the organic electroluminescent compounds according to the invention have good luminous efficiency and life property of material, OLED's having very good operation lifetime can be manufactured.

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EUROPEAN SEARCH REPORT

Application Number
EP 08 25 4194

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2006/077130 A (SENSIENT IMAGING TECHNOLOGIES [DE]; LISCHEWSKI VOLKER [DE]; TSCHUNARJE) 27 July 2006 (2006-07-27)	1-8	INV. C09K11/06 C09K11/07
Y	* page 1, lines 15-21; compound 13 *	9	C07C211/47 C07C211/58
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Y	* claims; figures; compounds 1-18 *	9	
Y	RAU: "Reciprocity relation between photovoltaic quantum efficiency and electroluminescent emission of solar cells" PHYSICAL REVIEW B, vol. 76, 2 August 2007 (2007-08-02), pages 085303-1-085303-8, XP002525585 * page 1, left-hand column, paragraph 1 *	9	
X	JP 2003 048868 A (MITSUI CHEMICALS INC) 21 February 2003 (2003-02-21) * abstract *	1-3	
X	& CHEMICAL ABSTRACTS, vol. 54, no. 2, 2003, Columbus, Ohio, US; abstract no.: 2003:132354, * abstract; compounds 498572-34-2 *	1-3	

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TECHNICAL FIELDS SEARCHED (IPC)
C07C
C07K

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	28 April 2009	Pérez Carlón, Raquel

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
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Application Number
EP 08 25 4194

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	LAMBERT CHRISTOPH ET AL: "Tuning of intervalence charge transfer energies by substituents in one-dimensional bis(triarylamine) systems" JOURNAL OF THE CHEMICAL SOCIETY, PERKIN TRANSACTIONS 2, CHEMICAL SOCIETY. LETCHWORTH, GB, no. 12, 1 January 2002 (2002-01-01), pages 2039-2043, XP009115845 ISSN: 1472-779X * page 2039, left-hand column, paragraph 1; compounds 1-4 *	1-3	
X	KANG, WANG: "Syntheses and photophysical properties of rigid-rod conjugated compounds based on N-7-azaindole and 2,2'-dipyridylamine" TETRAHEDRON LETTERS, vol. 43, 2002, pages 3711-3713, XP002525586 * compound 7 *	1-3	TECHNICAL FIELDS SEARCHED (IPC)
X	LAMBERT, GASCHLER, NÖLL, WEBER, SCHMÄLZLIN, BRÄUCHLE, MEERHOLZ: "Cationic pi-electron systems with high quadratic hyperpolarisability" JOURNAL CHEMICAL SOCIETY, PERKIN TRANSACTIONS 2, 2001, pages 964-974, XP002525587 Synthesis of 2a before the quaternization step, bridging paragraph on page 971	1-3	

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~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	28 April 2009	Pérez Carlón, Raquel

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DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	MICHINOBU, BOUDON, GISSELBRECHT, SEILER, FRANK, MOONEN, GROSS, DIEDERICH: "Donor-substituted 1,1,4,4-tetracyanobutadienes (TCBDs): New chromophores with efficient intramolecular charge-transfer interactions by atom-economic synthesis" CHEMISTRY, AN EUROPEAN JOURNAL, vol. 12, 2006, pages 1889-1905, XP002525588 * compounds 31, 33 * -----	1-3	
X	LAMBERT, NÖLL: "Intervalence charge-transfer bands in triphenylamine-based polymers" SYNTHETIC METALS, vol. 139, 2003, pages 57-62, XP009115808 * compounds 1,2 * -----	1-3	
X	ROSOKHA SERGIY V ET AL: "Very Fast Electron Migrations within p-Doped Aromatic Cofacial Arrays Leading to Three-Dimensional (Toroidal) .pi.-Delocalization" JOURNAL OF THE AMERICAN CHEMICAL SOCIETY, AMERICAN CHEMICAL SOCIETY, WASHINGTON, DC., US, vol. 128, no. 29, 26 July 2006 (2006-07-26), pages 9394-9407, XP009115833 ISSN: 0002-7863 [retrieved on 2006-07-04] * page 9405, left-hand column, lines 20,33,34 * -----	1-3	TECHNICAL FIELDS SEARCHED (IPC)

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	28 April 2009	Pérez Carlón, Raquel

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Application Number
EP 08 25 4194

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

☒ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

Invention 1: claims 1(part)-9(part)

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 08 25 4194

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

Invention 1: claims 1(part)-9(part)

Electroluminescent compounds, devices and solar cells comprising compounds of formula 1 in which one of Ar1 and Ar2 is phenyl.

Invention 2-48: claims 1(part)-9(part)

Electroluminescent compounds, devices and solar cells comprising compounds of formula 1 in which one of Ar1 and Ar2 is selected from one of the rest of moieties listed in claim 2, taking into account that quinoline is listed twice.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 25 4194

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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28-04-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2006077130 A	27-07-2006	NONE	
JP 2005174735 A	30-06-2005	JP 4280617 B2	17-06-2009
JP 2003048868 A	21-02-2003	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

专利名称(译)	新型有机电致发光化合物和使用其的有机电致发光器件		
公开(公告)号	EP2075309A3	公开(公告)日	2009-09-23
申请号	EP2008254194	申请日	2008-12-31
申请(专利权)人(译)	GRACEL显示增量.		
当前申请(专利权)人(译)	GRACEL显示增量.		
[标]发明人	EUM SUNG JIN CHO YOUNG JUN KWON HYUCK JOO KIM BONG OK KIM SUNG MIN YOON SEUNG SOO		
发明人	EUM, SUNG JIN CHO, YOUNG JUN KWON, HYUCK JOO KIM, BONG OK KIM, SUNG MIN YOON, SEUNG SOO		
IPC分类号	C09K11/06 C09K11/07 C07C211/47 C07C211/58 C07C211/60 C07C211/61		
CPC分类号	C07C211/61 C07C2603/18 C07C2603/90 C09K11/06 C09K2211/1007 C09K2211/1011 C09K2211/1014 C09K2211/1029 C09K2211/1037 C09K2211/1044 C09K2211/1059 C09K2211/1088 C09K2211/1092 H01L51/006 H01L51/5056 H05B33/14 Y02E10/549 Y02P70/521		
优先权	1020070142000 2007-12-31 KR		
其他公开文献	EP2075309A2		
外部链接	Espacenet		

摘要(译)

本发明涉及新型有机电致发光化合物，以及采用其作为电致发光材料的有机电致发光器件。具体地，根据本发明的有机电致发光化合物的特征在于它们由化学式（1）表示：由于根据本发明的有机电致发光化合物具有良好的发光效率和材料的寿命特性，所以具有非常好的操作寿命的OLED可以制造。