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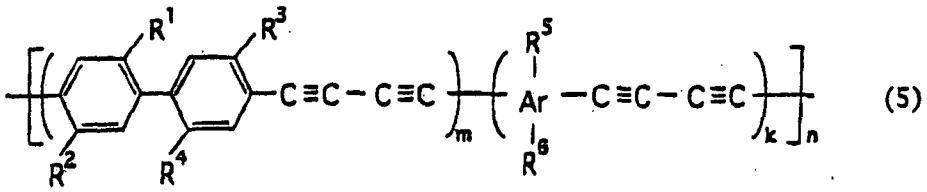
(54) **Organic luminous material and organic light-emitting device**

(57) An organic luminous material having the general formula



(5)

where Ar denotes an arylene group, R^1, R^2, R^3, R^4, R^5 and R^6, denotes substituents which can be the same or different or some of which can be the same and other(s) different, m and k denote the copolymerization ratio and n denotes the degree of polymerisation.

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EUROPEAN SEARCH REPORT

Application Number
EP 06 01 9656

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	US 5 876 864 A (KIM CHUNG YUP [KR] ET AL) 2 March 1999 (1999-03-02) * columns 4-9; examples; table 1 *	1-14,17, 18	INV. H05B33/14 C08F38/00 C09K11/06
X	EP 0 299 384 A2 (MITSUBISHI PETROCHEMICAL CO [JP]) 18 January 1989 (1989-01-18) * claims *	1-14,17, 18	
X	C. WEDER, M.S. WRIGHTON: "Efficient solid-state photoluminescence in new poly(2,5-dialkoxy-p-phenyleneethynylene)s" MACROMOLECULES, vol. 29, 1996, pages 5157-5165, XP002415717 * the whole document *	1-14,17, 18	
X	M. MORONI, J. LE MOIGNE, S. LUZZATI: "rIGID ROD CONJUGATED POLYMERS FOR NONLINEAR OPTICS. 1. CHARACTERIZATION AND LINEAR OPTICAL PROPERTIES OF POLY(ARYLENEETHYNYLENE) DERIVATIVES" MACROMOLECULES, vol. 27, 1994, pages 562-571, XP002415718 * the whole document *	1-14,17, 18	TECHNICAL FIELDS SEARCHED (IPC) C09K H05B C08F
X	X.T. TAO ET.AL.: "Novel main-chain poly-carbazoles as hole and electron transport materials in polymer light-emitting diodes" APPL. PHYS. LETT., vol. 71, no. 14, 1997, pages 1921-1923, XP002339411 * the whole document *	5-14,17, 18	
X	DE 43 39 646 A1 (BASF AG, 67063 LUDWIGSHAFEN, DE) 24 May 1995 (1995-05-24) * the whole document *	5-14	

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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	19 January 2007	Doslik, Natasa

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
L : document cited for other reasons

& : member of the same patent family, corresponding document

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European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 9656

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	REMMERS M ET AL: "THE OPTICAL, ELECTRONIC, AND ELECTROLUMINESCENT PROPERTIES OF NOVELPOLY(P-PHENYLENE)-RELATED POLYMERS" MACROMOLECULES, AMERICAN CHEMICAL SOCIETY. EASTON, US, vol. 29, no. 23, 4 November 1996 (1996-11-04), pages 7432-7445, XP000631108 ISSN: 0024-9297 * the whole document *	5-14	
A	DE 39 10 260 A1 (BASF AG [DE]) 4 October 1990 (1990-10-04) * the whole document *	1-4	
A	US 4 895 975 A (FUJIWARA ET AL) 23 January 1990 (1990-01-23) * the whole document *	1-4	
A	YANG M ET AL: "Characterization and fluorescence properties of thiophene-modified pi-conjugated nickel poly-yne polymers" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 40, no. 11, May 1999 (1999-05), pages 3203-3209, XP004157673 ISSN: 0032-3861 * the whole document *	1-14	TECHNICAL FIELDS SEARCHED (IPC)

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Application Number
EP 06 01 9656

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	HOLZER W ET AL: "Excitation intensity-dependent fluorescence behaviour of some luminescent polymers" POLYMER, ELSEVIER SCIENCE PUBLISHERS B.V, GB, vol. 39, no. 16, July 1998 (1998-07), pages 3651-3656, XP004120980 ISSN: 0032-3861 * the whole document *	1-14	
A	T. HATTORI ET.AL.: "Photoinduced absorption and luminescence in polydiacetylenes" J.PHS.C: SOLID STATE PHYS., vol. 17, 1984, pages L881-L888, XP002339413 * the whole document *	1-14,17, 18	
			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	19 January 2007	Doslik, Natasa

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European Patent Office

Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing more than ten claims.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims 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 the first ten claims.

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:

see sheet B

European Patent Office

LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 06 01 9656

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:

1. claims: 1-4

An organic luminous material made of a polymer of formula (5).

1.1. claims: 5-14

Organic light-emitting device comprising a lower electrode, a luminous layer made of a polymer of formula (1) and an upper electrode.

1.2. claims: 17,18

An organic luminous material made of a polymer of formula (4).

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2. claims: 15,16

An organic luminous material made of a polymer of formula (3).

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3. claims: 19-21

An organic luminous material made of a polymer of formula (6).

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 06 01 9656

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

19-01-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5876864 A	02-03-1999	NONE	
EP 0299384 A2	18-01-1989	DE 3864208 D1	19-09-1991
		JP 1139255 A	31-05-1989
		JP 2578442 B2	05-02-1997
		US 4863763 A	05-09-1989
DE 4339646 A1	24-05-1995	NONE	
DE 3910260 A1	04-10-1990	NONE	
US 4895975 A	23-01-1990	JP 1599199 C	31-01-1991
		JP 2019101 B	27-04-1990
		JP 63275541 A	14-11-1988

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)	有机发光材料和有机发光器件		
公开(公告)号	EP1768466A3	公开(公告)日	2007-06-27
申请号	EP2006019656	申请日	2001-04-27
[标]申请(专利权)人(译)	富士通株式会社		
申请(专利权)人(译)	FUJITSU LIMITED		
当前申请(专利权)人(译)	FUJITSU LIMITED		
[标]发明人	YOSHIKAWA KOTA KIJIMA MASASHI SHIRAKAWA HIDEKI KINOSHITA IKUO		
发明人	YOSHIKAWA, KOTA KIJIMA, MASASHI SHIRAKAWA, HIDEKI KINOSHITA, IKUO		
IPC分类号	H05B33/14 C08F38/00 C09K11/06 H01L51/50 C08G61/02 H01L51/30		
CPC分类号	C08F38/00 C08G61/02 C09K11/06 C09K2211/1092 C09K2211/1425 H01L51/0035 H01L51/0043 H01L51/5012 Y10S428/917		
优先权	2000128364 2000-04-27 JP 2000288692 2000-09-22 JP 2001125359 2001-04-24 JP		
其他公开文献	EP1768466A2 EP1768466B1		
外部链接	Espacenet		

摘要(译)

具有通式的有机发光材料，其中Ar表示亚芳基，R 1，R 2，R 3，R 4，R 5和R 6表示可以相同或不同的取代基，或者其中一些可以相同或不同的取代基。m和k表示共聚比，n表示聚合度。