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(54) Title: MAGENTA DYES AND THEIR USE IN INK JET PRINTING

(57) Abstract: A water-soluble dye of the Formula (1): D<sub>1</sub>-L-D<sub>2</sub> Formula (1) wherein: D<sub>1</sub> and D<sub>2</sub> each independently is an anthrapyridone, anthrapyrazole, anthrapyrimidine or anthrapyrimidone group; and L is a single covalent bond or a linking group which permits at least partial delocalisation of electrons between D<sub>1</sub> and D<sub>2</sub>. Also, compositions and inks, printing processes, printed material and ink-jet printer cartridges.



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# INTERNATIONAL SEARCH REPORT

International application No  
PCT/GB2006/001579

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> INV. C09B5/14 C09D11/00		
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) C09B C09D		
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, CHEM ABS Data, 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	EP 1 437 385 A1 (NIPPON KAYAKU KK [JP]) 14 July 2004 (2004-07-14)  claims; examples -----	1,2, 7-10,12, 14-21
X	DATABASE WPI Week 198739 Derwent Publications Ltd., London, GB; AN 1987-274786 XP002407112 - & JP 62 192474 A (CANON KK) 24 August 1987 (1987-08-24) page 491 - page 493 -----	1,2,7-9, 14-21
X	US 2004/174420 A1 (KITAMURA KAZUHIKO [JP] ET AL) 9 September 2004 (2004-09-09) the whole document ----- -/--	1,2,7-9, 14-21
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C.		
<input checked="" type="checkbox"/> 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	"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	
"E" earlier document but published on or after the international filing date	"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	
"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)	"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.	
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family	
"P" document published prior to the international filing date but later than the priority date claimed		
Date of the actual completion of the international search  13 November 2006	Date of mailing of the international search report  02.02.07	
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Authorized officer  Ketterer, Michael	

## INTERNATIONAL SEARCH REPORT

International application No

PCT/GB2006/001579

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2004/048745 A1 (KITAMURA KAZUHIKO [JP] ET AL) 11 March 2004 (2004-03-11) the whole document -----	1,2,7-9, 14-21
A	EP 0 927 747 A1 (NIPPON KAYAKU KK [JP]) 7 July 1999 (1999-07-07) examples -----	1,2,8, 11,15-21
P,A	EP 1 626 072 A (XEROX CORP [US]) 15 February 2006 (2006-02-15)  page 30 - page 36 page 64 - page 68 page 99 - page 102 claims 5,9 -----	1,2, 7-10,12, 14-21
A	FR 1 394 618 A (GOSSOUDARSTVENNY NII ORGANITCH) 2 April 1965 (1965-04-02) examples 9,10 -----	1,2
A	GB 1 047 297 A (ICI LTD.) 2 November 1966 (1966-11-02) example 3 -----	1,2,6,9, 10,12

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB2006/001579

## Box 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 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 fee, this Authority did not invite payment of any additional fee.
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 (partially), 2 (completely), 6-21 (partially)

Remark on Protest

The additional search fees were accompanied by the applicant's protest.

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 (partially), 2 (completely), 6-21 (partially)

claim 1 (partially):

A watersoluble dye of the formula (1), wherein D1 and D2 are an anthrapyridone group and L is a single covalent bond or a linking group which permits at least partial delocalisation of electrons between D1 and D2

claim 2 (compl.):

A dye according to claim 1 wherein D1 and D2 are anthrapyridone groups

claims 6-21 (partially):

only for subject matter (dyes, compositions, image forming process and ink cartridges) in which D1 and D2 are an anthrapyridone group

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2. claims: 1 (partially), 3 (completely), 6-21 (partially)

claim 1 (partially):

A watersoluble dye of the formula (1), wherein D1 and D2 are an anthrapyrazole group and L is a single covalent bond or a linking group which permits at least partial delocalisation of electrons between D1 and D2

claim 3 (compl.):

A dye according to claim 1 wherein D1 and D2 are anthrapyrazole groups

claims 6-21 (partially):

only for subject matter (dyes, compositions, image forming process and ink cartridges) in which D1 and D2 are an anthrapyrazole group

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3. claims: 1 (partially), 4 (completely), 5 (completely), 6-21 (partially)

claim 1 (partially):

A watersoluble dye of the formula (1), wherein D1 and D2 are anthrapyrimidine/ anthrapyrimidone groups and L is a single covalent bond or a linking group which permits at least partial delocalisation of electrons between D1 and D2

claim 3 (compl.):

A dye according to claim 1 wherein D1 and D2 are anthrapyrimidine/ anthrapyrimidone groups

claims 6-21 (partially):

only for subject matter (dyes, compositions, image forming process and ink cartridges) in which D1 and D2 are an anthrapyrimidine/ anthrapyrimidone group (thereby D1 and D2 are equal at the same time)

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4. claims: 1 (partially), 6-21 (partially)

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

claim 1 (partially):

A watersoluble dye of the formula (1), wherein D1 and D2 are an anthrapyridone, an anthrapyrazole, an anthrapyrimidine or an anthrapyrimidone group and L is a single covalent bond or a linking group which permits at least partial delocalisation of electrons between D1 and D2; whereby D1 and D2 are not of the same chromophore type at the same time

claims 6-21 (partially):  
only for subject matter (dyes, compositions, image forming process and ink cartridges) in which D1 and D2 are an anthrapyridone, an anthrapyrazole, an anthrapyrimidine or an anthrapyrimidone group, but are not of the same chromophore type at the same time

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## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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