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Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: DYE SETS FOR INK-JET INK IMAGING

(57) Abstract: The present invention is drawn to dye sets for formulating ink-jet inks, including ink sets having six ink-jet inks. In one embodiment, the dye set can comprise a yellow dye for formulating a yellow ink, a pair of magenta dyes for formulating a magenta ink and a pale magenta ink, a pair of cyan dyes for formulating a cyan ink and a pale cyan ink, and a black dye for formulating a black ink-jet ink. The pair of magenta dyes can be a transition metal-containing azo dye and a non-metallized dye. The pair of cyan dyes can be a first copper phthalocyanine dye and a second copper phthalocyanine dye that is different than the first copper phthalocyanine dye.



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INTERNATIONAL SEARCH REPORT

International application No
PCT/US2006/008607

A. CLASSIFICATION OF SUBJECT MATTER
INV. C09D11/00

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)
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, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2004/216638 A1 (ROLLY LUANNE J) 4 November 2004 (2004-11-04) the whole document	1-15
A	US 6 559 292 B1 (MISTRY PRAHALAD MANIBHAI ET AL) 6 May 2003 (2003-05-06) the whole document	1,2
A	WO 2005/010110 A (HEWLETT PACKARD DEVELOPMENT CO [US]; KABALNOV ALEXEY S [US]; DUPUY CHA) 3 February 2005 (2005-02-03) page 8, line 21 - page 10, line 8; table 3	4-7
A	EP 0 985 716 A1 (SEIKO EPSON CORP [JP]) 15 March 2000 (2000-03-15) examples A4,B4; tables	4-15
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☒ 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 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

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INTERNATIONAL SEARCH REPORT

International application No

PCT/US2006/008607

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1 164 174 A (CANON KK [JP]) 19 December 2001 (2001-12-19)	4-7
A	examples 6,7; tables -----	8-15
A	US 2002/112641 A1 (NARUSE HIDEAKI [JP] ET AL) 22 August 2002 (2002-08-22) tables 2,3 -----	4-15
A	WO 2004/050778 A (HEWLETT PACKARD DEVELOPMENT CO [US]) 17 June 2004 (2004-06-17) claims 1,5 -----	4-15

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2006/008607

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.:

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: 1-2

A dye set for ink-jet inks comprising (a) a black dye having a structure of Formula I and (b) at least one of dye having the formula II, III, or IV.

2. claim: 3

A dye set for ink-jet inks including a first cyan dye and a second cyan dye, wherein the dyes having the same general formula (of cl.3) but different amounts of $\text{SO}_2\text{NH-alkyl-OH}$ groups.

3. claims: 4-7

A dye set for ink-jet inks comprising a pair of magenta dyes for formulating a magenta ink and a pale magenta ink, wherein the pair of magenta dyes is used to formulate the magenta ink and where only one dye of the pair of magenta dyes is used to formulate the pale magenta ink.

4. claims: 8-15

A dye set for ink-jet inks comprising: 1) a yellow dye, 2) a pair of magenta dyes: 2a) a transition metal-containing azo dye and 2b) non-metallized dye, 3) a pair of cyan dyes: two different copper phthalocyanine dyes and 4) a black dye.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2006/008607

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