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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:
24 September 2009

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(54) Title: IMPROVEMENTS IN AND RELATING TO TONERS MADE FROM LATEXES

(57) Abstract: A toner comprising toner particles which comprise binder resin and colorant, wherein the binder resin is made from latexes which comprise a low molecular weight (LMW) latex of resin particles having a weight average molecular weight (Mw) less than 50,000 and a medium molecular weight (MMW) latex of resin particles having a Mw from 50,000 to 500,000, wherein the glass transition temperature (Tg) of the resin particles of the LMW latex is not greater than 520C.

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2008/003572

A. CLASSIFICATION OF SUBJECT MATTER
INV. G03G9/08 G03G9/087 C08F212/08 C08L25/14

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)
G03G C08F C08L

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 96/35148 A (LG CHEMICAL LTD [KR]; YOO JIN NYOUNG [KR]; KIM MYUNG MAN [KR]; CHANG Y) 7 November 1996 (1996-11-07) claims; example 4	1-16,28, 29
A	US 5 837 415 A (UCHIDA TSUYOSHI [JP]) 17 November 1998 (1998-11-17)	1-16,28, 29
A	EP 0 481 280 A (DOW CHEMICAL CO [US]) 22 April 1992 (1992-04-22) claims	17-21
X	EP 1 808 733 A (XEROX CORP [US]) 18 July 2007 (2007-07-18) claim 7	22-27

☐ 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	Date of mailing of the international search report
16 July 2009	23/07/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Buscha, Andreas

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB2008/003572

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 allsearchable 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 reportcovers 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 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: 1-16, 28-29(partially)

Toner comprising binder made from LMW (Mw <50.000, Tg<=52deg.C) and MMW (Mw=50.000-500.000) latexes, and process for preparing such a toner, image forming method and toner cartridge using the toner

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2. claims: 17-21, 28-29(partially)

LMW latex with Mw<50.000 and Tg <=52 deg.C polymerized from a monomer mixture of
45-80 wt. parts styrenic monomer
15-45 wt. parts low Tg (meth)acrylate
1-7 wt.parts high Tg (meth)acrylate and
1-5 wt.parts polar functional vinyl monomer,
and toner comprising binder made from such a LMW latex

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3. claims: 22-27, 28-29(partially)

MMW latex with Mw=50.000 - 200.000 and Tg=55-70 deg.C polymerized from a monomer mixture of
45-88 wt. parts styrenic monomer
10-50 wt. parts of alkyl (meth)acrylate
1-10 wt.parts polar functional vinyl monomer,
and toner comprising binder made from such a MMW latex

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2008/003572

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9635148 A	07-11-1996	AT 182991 T	15-08-1999
		AU 678945 B2	12-06-1997
		AU 5516996 A	21-11-1996
		BR 9606353 A	25-11-1997
		CA 2194213 A1	07-11-1996
		DE 69603562 D1	09-09-1999
		DE 69603562 T2	17-02-2000
		EP 0769164 A1	23-04-1997
		ES 2136987 T3	01-12-1999
		FI 965295 A	27-02-1997
		JP 2777676 B2	23-07-1998
		JP 9510752 T	28-10-1997
		NO 965626 A	13-02-1997
		US 5852147 A	22-12-1998
US 5837415 A	17-11-1998	NONE	
EP 0481280 A	22-04-1992	AU 637721 B2	03-06-1993
		AU 8571691 A	30-04-1992
		CA 2053060 A1	17-04-1992
		JP 4283254 A	08-10-1992
		NO 913959 A	21-04-1992
EP 1808733 A	18-07-2007	NONE	