



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>7</sup> :</b> <b>C08F 2/50, C07F 3/04, 3/06, 5/02,</b> <b>C07D 295/037, C07C 251/30</b>	<b>A3</b>	<b>(11) International Publication Number:</b> <b>WO 00/18750</b>  <b>(43) International Publication Date:</b> 6 April 2000 (06.04.00)
<b>(21) International Application Number:</b> PCT/US99/22590  <b>(22) International Filing Date:</b> 28 September 1999 (28.09.99)  <b>(30) Priority Data:</b> 60/102,153 28 September 1998 (28.09.98) US 60/111,950 11 December 1998 (11.12.98) US 60/121,302 23 February 1999 (23.02.99) US 60/132,630 5 May 1999 (05.05.99) US  <b>(71) Applicants:</b> KIMBERLY-CLARK WORLDWIDE, INC. [US/US]; 401 North Lake Street, Neenah, WI 54956 (US). NOHR, Ronald, Sinclair [-/US]; 8955 Nesbit Lakes Drive, Alpharetta, GA 30202 (US). MACDONALD, John, Gavin [-/US]; 1472 Knollwood Terrace, Decatur, GA 30033 (US).  <b>(74) Agents:</b> WITHERS, James, D.; Jones & Askew, LLP, 2400 Monarch Tower, 3424 Peachtree Road, N.E., Atlanta, GA 30326 (US) et al.	<b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>  <b>(88) Date of publication of the international search report:</b> 3 August 2000 (03.08.00)	
<b>(54) Title:</b> CHELATES COMPRISING CHINOID GROUPS AS PHOTOINITIATORS		
<div style="text-align: center; margin-bottom: 20px;"> <math display="block">X_1 = \overset{\text{Z}_1}{\underset{\text{M}_1}{\text{C}}} \quad (I)</math> </div> <p><b>(57) Abstract</b></p> <p>The present invention is directed to new, energy-efficient, photoinitiators having general formula (I) wherein X<sub>1</sub> is a conjugated system such as one or more aryl groups or substituted aryl groups; Z<sub>1</sub> is -O, -S, an alkyl group having from one to six carbon atoms, an ester moiety, a ketone moiety, an amine moiety, an imine moiety, an ether moiety, an aryl or substituted aryl group, a metal or non-metal, or a metal or non-metal containing group, such as a zinc-containing group or a boron-containing group, respectively; and M<sub>1</sub> is an alkyl group, a substituted alkyl group, or forms a five member ring with Z<sub>1</sub>. The present invention is also directed to a method of generating a reactive species, which includes exposing one or more photoinitiators to radiation to form one or more reactive species. Also described are methods of polymerizing polymerizable materials, methods of curing an unsaturated oligomer/monomer mixture, and methods of laminating using the photoinitiators of the present invention. In addition, the present invention is directed to ink compositions, adhesive compositions and resins, and methods of printing using the above-described photoinitiators.</p>		

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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/US 99/22590

**A. CLASSIFICATION OF SUBJECT MATTER**  
 IPC 7 C08F2/50 C07F3/04 C07F3/06 C07F5/02 C07D295/037  
 C07C251/30

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)  
 IPC 7 C07D C07F C08F C07C

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)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 780 442 A (HEWLETT PACKARD CO) 25 June 1997 (1997-06-25) page 12, line 20 - line 40 page 15, line 10 -page 16 ---	1,4
X	CHEMICAL ABSTRACTS, vol. 80, no. 16, 22 April 1974 (1974-04-22) Columbus, Ohio, US; abstract no. 90673, FOGG, A. G. ET AL: "Ion selective electrodes based on brilliant green tetrathiocyanatezincate(II)" XP002133620 abstract & ANAL. LETT. (1973), 6(12), 1101-6 , --- -/--	1,2,4

Further documents are listed in the continuation of box C.       Patent family members are listed in annex.

Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"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)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"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</p> <p>"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</p> <p>"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.</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search  <b>21 March 2000</b>	Date of mailing of the international search report  <b>07/04/2000</b>
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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  <b>Bader, K</b>
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 99/22590

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 0 327 763 A (MINNESOTA MINING & MFG) 16 August 1989 (1989-08-16) page 7 -page 11 ---	1,2
A	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US SEGUROLA, JUAN ET AL: "Photocuring activity of several commercial, near UV activated photoinitiator in clear and pigmented systems" retrieved from STN Database accession no. 131:244630 XP002133621 abstract & J. COAT. TECHNOL. (1999), 71(894), 61-67 , ---	1,17,18
X	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US VON GERSDORFF, J. ET AL: "EPR and ENDOR investigations of dynamic processes in sterically overcrowded phenoxy-type galvinoxyl radicals" retrieved from STN Database accession no. 110:230977 CA XP002133622 abstract & MAGN. RESON. CHEM. (1988), 26(5), 416-24 ,1988, ---	1,4
X	DATABASE CHEMABS 'Online! CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US VASILAKOS, NICK P. ET AL: "Oxidative chlorination of dibenzothiophene" retrieved from STN Database accession no. 94:156664 CA XP002133623 abstract & IND. ENG. CHEM. PROCESS DES. DEV. (1981), 20(2), 376-9 ,1981, ---	1,4
X	DODD, GREGORY S. ET AL: "Steric effects in di- and triarylmethane dyes. XII. Electronic absorption spectra of derivatives of Michler's hydrol blue containing.alpha.-trifluoromethyl groups" J. CHEM. SOC., PERKIN TRANS. 2 (1973), (15), 2151-3 ,1973, XP002133619 the whole document --- -/--	1,2,4

# INTERNATIONAL SEARCH REPORT

International Application No PCT/US 99/22590
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**C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 010, no. 185 (C-357), 27 June 1986 (1986-06-27) & JP 61 031490 A (MITSUBISHI CHEM IND LTD), 13 February 1986 (1986-02-13) abstract ---	1, 2, 4, 5
X	PATENT ABSTRACTS OF JAPAN vol. 017, no. 576 (M-1499), 20 October 1993 (1993-10-20) & JP 05 169839 A (MITSUBISHI KASEI CORP), 9 July 1993 (1993-07-09) abstract -----	1, 2, 4, 5

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 99/ 22590

## Box I Observations where certain claims were found unsearchable (Continuation of item 1 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:  
see FURTHER INFORMATION sheet PCT/ISA/210
  
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 II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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

Continuation of Box I.2

Present claims 1, 4, 5, 6, 9-12 relate to an extremely large number of possible compounds. In fact, the claims contain so many options that a lack of clarity within the meaning of Article 6 PCT arises to such an extent as to render a meaningful search of the claims impossible. Consequently, the search has been carried out for those parts of the application which do appear to be clear, namely claims 2, 7, 8, 13, 14, 15, 16, 17-18 (as far as relating to the content of the preceding claims)

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 99/22590

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0780442 A	25-06-1997	US 5558965 A JP 9190003 A	24-09-1996 22-07-1997
EP 0327763 A	16-08-1989	AU 2704988 A JP 2004807 A US 5240780 A	10-08-1989 09-01-1990 31-08-1993
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JP 05169839 A	09-07-1993	NONE	