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02 March 1995 (02.03.95)

(54) Title: FUNCTIONALIZED MEROCYANINE DYES AND POLYMERS INCORPORATING SUCH DYES

(57) Abstract

Nonlinear-optic (NLO) compositions containing functionalized merocyanine dyes, such that the molecules, comprising the NLO-active compositions have a functional group at each end of the molecule and each functional group differing in reactivity, thus permitting stepwise reaction of each functional group, and NLO-active molecules prepared from hemioxonol dyes derived with (meth)acrylate or (meth)acrylamide groups, and their uses in devices such as second harmonic generators or polymer integrated optics.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US 92/10790

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: G02F 1/35, C09B 23/00, C07C 265/12, C07C 275/28
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)

IPC5: G02F, C09B, 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 practicable, search terms used)

WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CH, A, 530445 (AGFA-GEVAERT AKTIENGESELLSCHAFT), 29 December 1972 (29.12.72), see columns 5-8	3-5
A	US, A, 2956881 (EASTMAN KODAK COMPANY), 18 October 1960 (18.10.60)	1-40
A	US, A, 4906407 (RONALD N. DEMARTINO ET AL.), 6 March 1990 (06.03.90)	1-40
A	US, A, 5001209 (CAREL T.J. WREESMANN ET AL.), 19 March 1991 (19.03.91)	1-40

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
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"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
3 Sept 1993

Date of mailing of the international search report
12. 10. 93

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INTERNATIONAL SEARCH REPORT

Inter ional application No.
PCT/US 92/10790

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, A1, 0271251 (MINNESOTA MINING AND MANUFACTURING COMPANY), 15 June 1988 (15.06.88), see page 7, lines 6,10,19,23 --	43-45
X	US, A, 4318850 (FUMIHIKO YAMAMOTO ET AL.), 9 March 1982 (09.03.82), see especially columns 4-5 and example 20, column 9 --	41
X	Chemical Abstracts, Volume 68, No 25, 17 June 1968 (17.06.68), (Columbus, Ohio, USA), A. Marvon et al, "Isothiocyanates. XXI. The synthesis of p-substituted derivaives of isothiocyanatostilbenes", page 10996, THE ABSTRACT No 114193z, Chem. Zvesti 1986, 22 (2), 102-110 --	42

INTERNATIONAL SEARCH REPORT

Inter·tional application No.

PCT/US 92/10790

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.: 1
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:

Claim 1 is too broadly formulated to permit a meaningful search. The search of claim 1 has therefore been incomplete (see Art. 6).

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:

Claims 1-40

Claims 41

Claims 42

Claims 43-45

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 searches 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.

INVITATION TO PAY ADDITIONAL FEES

International application No.
PCT/US 92/10790

The acceptance of a single general inventive concept covering end products as well as products used to prepare these end products (intermediates) implies that the intermediates are closely interconnected with the end products by their use for incorporation of the essential structural part into the end products.

Therefore, a single general inventive concept based on the relationship intermediates/end products is lacking and this leads to the presence of the subjects as listed below, each falling under its own inventive concept.

Claims 1-40: Concerning a nonlineaphore comprising a functionalized merocyanine dye with a structural unit selected from rhodanine, isoxazolone, barbituric acid and thiobarbituric acid structural units.

Claim 41: Concerning 7-nitrofluorenyl-4-isocyanate.

Claim 42: Concerning 4'-nitrostilbene-4-isocyanat.

Claims 43-45: Concerning 1-(polynuclear nitroaryl)-3-

(hydroxyalkyl)urea.

INTERNATIONAL SEARCH REPORT

Information on patent family members

30/07/93

International application No.
PCT/US 92/10790

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
CH-A- 530445	29/12/72	BE-A- 733124	17/11/69
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		BE-A- 589552	00/00/00
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