

PATENT COOPERATION TREATY

PCT

REC'D 07 AUG 2003

WIPO PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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| Applicant's or agent's file reference P16289PC00/CA | FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416) | |
| International application No. PCT/SE02/00860 | International filing date (day/month/year) 10.05.2002 | Priority date (day/month/year) 10.05.2001 |
| International Patent Classification (IPC) or national classification and IPC ₇ C09B 49/00 | | |
| Applicant Light Up Technologies AB et al | | |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheets.

3. This report contains indications relating to the following items:

- I Basis of the report
- II Priority
- III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV Lack of unity of invention
- V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI Certain documents cited
- VII Certain defects in the international application
- VIII Certain observations on the international application

| | |
|--|--|
| Date of submission of the demand 06.12.2002 | Date of completion of this report 01.08.2003 |
| Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88 | Authorized officer Carolina Gómez Lagerlöf/BS Telephone No. 08-782 25 00 |

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE02/00860

I. Basis of the report

1. With regard to the **elements** of the international application:*

- the international application as originally filed
- the description:
pages 1-32 , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____
- the claims:
pages _____ , as originally filed
pages _____ , as amended (together with any statement) under article 19
pages _____ , filed with the demand
pages 33-34 , filed with the letter of 13-06-2003
- the drawings:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____
- the sequence listing part of the description:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language _____ which is:

- the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages _____
- the claims, Nos. _____
- the drawings, sheet/fig _____

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

** Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/SE02/00860

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-12</u> | YES |
| | Claims | _____ | NO |
| Inventive step (IS) | Claims | <u>1-12</u> | YES |
| | Claims | _____ | NO |
| Industrial applicability (IA) | Claims | <u>1-12</u> | YES |
| | Claims | _____ | NO |

2. Citations and explanations (Rule 70.7)

During the search the following documents were found:

A CA 83:181080h

B US 5656449

Document A discloses imidacarbocyanines with a similar structure as the claimed compounds.

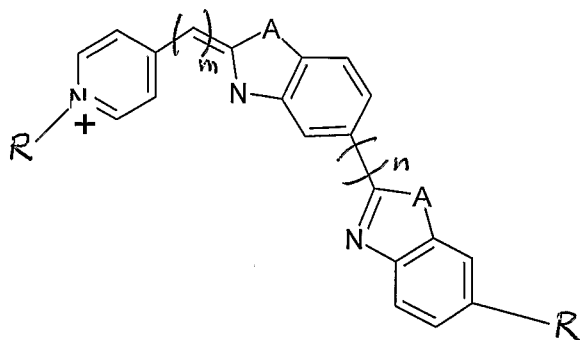
Document B shows fluorescent dyes for nucleic acids.

The documents show the general state of the art.

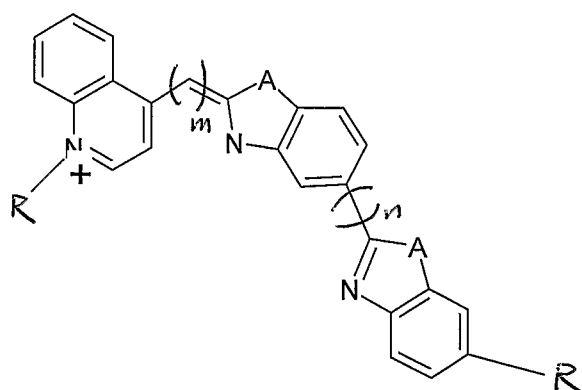
Thus, claims 1-12 are considered to fulfil the requirements of novelty, inventive step and industrial applicability.

CLAIMS.

1. A cyanine dye binding in the groove of DNA, selected from the group of



or



wherein A_1 and A_2 are each independently O, S, or N, and R is H or a carbohydrate that may contain a hetero atom, and m is 0 to 5, and n is 0 to 5.

2. A cyanine dye according to claim 1, wherein R is methyl, or ethyl, and m is 1 and n is 0.
3. A cyanine dye according to claim 1, wherein R is methyl, or ethyl, and m is 1 and n is 0 and A_1 and A_2 is S.
4. A cyanine dye according to claim 1, wherein R is methyl, or ethyl, and m is 1 and n is 0 and A_1 and A_2 is O.
5. A cyanine dye according to claim 1, wherein R is methyl, or ethyl, and m is 1 and n is 0 and A_1 is S and A_2 is O.
6. A cyanine dye according to claim 1, having the pyridine/quinoline ring in 2-position.

7. Probe for nucleic acid hybridisation comprising a cyanine dye according to claims 1-6.
8. Method for carrying out a real-time PCR-reaction of a DNA template, wherein a fluorescent dye according to claims 1-6 increasing its fluorescent reaction when it is looked in a minor groove position in a double stranded DNA is used, whereby the dye comprises at least 2 aromatic ring systems both comprising at least one nitrogen atom, which rings are linked by a alkine group having up to four carbon atoms to form a conjugated bond, and the dye further comprises at least a third aromatic system linked thereto via a bond having a significant double bond character, such as a single bond or a ethin bond, to provide a stiff conjugated system.
9. Method according to claim 8, wherein the dye is an asymmetric cyanine dye.
10. Method according to claim 8, wherein one of the cyanine residues contains S and/or O.
11. Method according to claim 8, wherein the dye compound is crescent shaped.
12. Method according to claim 8, wherein the dye is a derivative according to one or more of claims 1-6.