Abstract:
The present invention relates to the detection of molecules, such as proteins and DNA, and their use in biosensor applications.

Title: ULTRA SENSITIVE TAPERED FIBER OPTIC BIOSENSOR FOR PATHOGENS, PROTEINS AND DNA
Date of publication of the international search report:
10 July 2008
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

IPC: G02B 6/02(2006.01), 6/26(2006.01), 6/34(2006.01)

USPC: 385/50,3 1,37,43,123

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)

US 385/30,31,37,43,123

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)

EAST database

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>US 6,445,851 (Rakuljic et al) 03 Sep 2002 (03.09.2002), col. 5 line 6 - col. 7, line 26</td>
<td>1-9, 14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Y</td>
<td></td>
<td>10, 11</td>
</tr>
<tr>
<td>X</td>
<td>US 6,445,855 (Stowe et al) 03 Sep 2003 (03.09.2002), entire document</td>
<td>1-3</td>
</tr>
<tr>
<td>X</td>
<td>US 6,611,643 (Birk et al) 26 Aug 2003 (26.08.2003), Fig. 8</td>
<td>1</td>
</tr>
</tbody>
</table>

D. Further documents are listed in the continuation of Box C.

* 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 application or patent published on or after the international filing date
  "L" document which may throw doubts on priority claims or which is cited to establish the publication date of another citation or other special reason (as specified)
  "O" document referred to in an oral disclosure, use, exhibition or other means
  "P" 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

See patent family annex

Date of the actual completion of the international search
17 March 2008 (17.03.2008)

Date of mailing the international search report
25 March 2008

Name and mailing address of the ISA/US
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Form PCT/ISA/210 (second sheet) (April 2007)
# INTERNATIONAL SEARCH REPORT

**PCT/US07/61 146**

## 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:

<table>
<thead>
<tr>
<th>Box No. II</th>
<th>Observations where certain claims were found unsearchable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Claims Nos because they relate to subject matter not required to be searched by this Authority, namely</td>
</tr>
<tr>
<td>2</td>
<td>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</td>
</tr>
<tr>
<td>3</td>
<td>Claims Nos because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a)</td>
</tr>
</tbody>
</table>

## 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:

- Please See Continuation Sheet

<table>
<thead>
<tr>
<th>Box No. III</th>
<th>Observations where unity of invention is lacking</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims</td>
</tr>
<tr>
<td>2</td>
<td>As all searchable claims could be searched without effort justifying additional fees, this Authority did not invite payment of any additional fees</td>
</tr>
<tr>
<td>3</td>
<td>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</td>
</tr>
<tr>
<td>4</td>
<td>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 1-14</td>
</tr>
</tbody>
</table>

**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

Form PCT/ISA/2 10 (continuation of first sheet(2)) (April 2007)
BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1. In order for all inventions to be examined, the appropriate additional examination fees must be paid.

Group I, claim(s) 1-14, drawn to a tapered fiber

Group II, claim(s) 15-18, drawn to a tapered fiber optic sensor

Group III, claim(s) 19-28, drawn to a method for sensing at least one analyte

The inventions listed as Groups I, II and III do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

1. The lack of unity of invention between Groups I, II, drawn to products involving a tapered fiber, and Group III, drawn to a method for sensing, is directly evident "a priori", as there is no subject matter common between the products and the method.

2. Between Group I, drawn to a tapered fiber, and Group II, drawn to an optic sensor, there is lack of unity a posteriori, since prior art presented in the Written Opinion has shown subject matter common to both Groups, i.e., Claim 1, is not a technical feature that defines a contribution over the prior art.