Title: MICROELECTRONIC SENSOR DEVICE FOR CONCENTRATION MEASUREMENTS

Abstract: The invention relates to a method and a magnetic sensor device for the determination of the concentration of target particles (2) in a sample fluid, wherein the amount of the target particles (2) in a sensitive region (14) is observed by sampling measurement signals with associated sensor units (10a-10d). The target particles (2) may optionally be bound to binding sites (3) in the sensitive region, and a parametric binding curve, e.g., a Langmuir isotherm, may be fitted to the sampled measurement signals to determine the desired particle concentration in the sample. Moreover, parameters like the sampling rate and the size of the sensitive region (14) can be dynamically fitted during the ongoing sampling process to improve the signal-to-noise ratio. In another embodiment of the invention, single events corresponding to the movement of target particles into, out of, or within the sensitive region are detected and counted.
A. CLASSIFICATION OF SUBJECT MATTER

INV. G01N33/543 G01N35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. DOCUMENTS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

G01N

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, WPI Data, INSPEC, COMPENDEX

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<th>Category</th>
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<th>Relevant to claim No</th>
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<td>X</td>
<td>RUCKER ET AL: &quot;Antibody microarrays for native toxin detection&quot;</td>
<td>1-7, 12-14</td>
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<td></td>
<td>ANALYTICAL BIOCHEMISTRY, ACADEMIC PRESS, NEW YORK, NY, US, vol. 339, no. 2,</td>
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<td></td>
<td>ISSN: 0003-2697 page 264, column 2</td>
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Further documents are listed in the continuation of Box C

See patent family annex

Date of the actual completion of the international search

23 October 2007

Date of mailing of the international search report

23/01/2008

Name and mailing address of the ISA

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Authorized officer

Stussi, Elisa
<table>
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<td>A</td>
<td>WO 03/054523 A (KONINKL PHILIPS ELECTRONICS NV [NL]; COEHOORN REINDER [NL]; PRINS MENN) 3 July 2003 (2003-07-03) page 21, line 1 - page 25, line 13</td>
<td>1-7, 12-14</td>
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**INTERNATIONAL SEARCH REPORT**

**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:

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see additional sheet
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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 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 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.:

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see annex
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**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.
This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-7, 12, 13, 14,

A microelectronic sensor device for the determination of the amount of target particles in a sample (title), comprising:
   a) a sample chamber for providing the sample;
   b) a sensitive region that is disposed adjacent to or within the sample chamber;
   c) at least one sensor unit for sampling repetitively measurement signals that are related to the amount of target particles in the sensitive region;
   d) an evaluation unit for determining the amount of target particles in the sample from the sampled measurement signals (claim 1). A method of using a sensor device with the features b), c), d) (claim 2).

2. claims: 8-11, 20-31

A magnetic sensor device, comprising an electrically driven magnetic sensor component for detecting magnetized particles in an associated sensitive region, wherein the size of said sensitive region can dynamically be adjusted.

3. claims: 15-19

Microelectronic sensor device according to claim 1 or method according to claim 2, wherein the measurement signals are indicative of the movement of a limited number of particles into, out of and/or within the sensitive region
<table>
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<td>WO 03054523 A 03-07-2003</td>
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