From the: INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
SPRUSON & FERGUSON (ASIA) PTE LTD
P.O. Box 1531, Robinson Road Post Office
903031 Singapore
Singapore

PCT
NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Rule 71.1)

Date of mailing (day/month/year) 04 December 2017

Applicant's or agent's file reference 1105SG188

<table>
<thead>
<tr>
<th>International application No.</th>
<th>International filing date (day/month/year)</th>
<th>Priority date (day/month/year)</th>
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<tbody>
<tr>
<td>PCT/SG2016/050408</td>
<td>24 August 2016</td>
<td>24 August 2015</td>
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</table>

Applicant TEMASEK POLYTECHNIC

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translations to those Offices.

4. **REMEMBER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

<table>
<thead>
<tr>
<th>Name and mailing address of the IPEA/AU</th>
<th>Authorised officer</th>
</tr>
</thead>
</table>
| AUSTRALIAN PATENT OFFICE
PO BOX 200, WODEN ACT 2606, AUSTRALIA |
Email address: pct@ipaustralia.gov.au |
<table>
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<tr>
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<tr>
<td>David Melhuish</td>
<td></td>
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</tbody>
</table>
AUSTRALIAN PATENT OFFICE (ISO 9001 Quality Certified Service) Telephone No. +61262832426 |

Form PCT/IPEA/416 (January 2004)
PATENT COOPERATION TREATY
PCT
INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Article 36 and Rule 70)

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<th>FOR FURTHER ACTION</th>
<th>See Form PCT/IPEA/416</th>
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International Patent Classification (IPC) or national classification and IPC
A61B 5/00 (2006.01) G01N 33/00 (2006.01)

Applicant
TEMASEK POLYTECHNIC

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

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

3. This report is also accompanied by ANNEXES, comprising:
   a. (sent to the applicant and to the International Bureau) a total of sheets, as follows:
      - sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions).
      - sheets containing rectifications not taken into account by this Authority because they were not available at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(c), 70.16 and 91.2).
      - Superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)).
   b. (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)), containing a sequence listing, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 36bis of Annex C of the Administrative Instructions).

4. This report contains indications relating to the following items:
   - Box No. I Basis of the report
   - Box No. II Priority
   - Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - Box No. IV Lack of unity of invention
   - Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
   - Box No. VI Certain documents cited
   - Box No. VII Certain defects in the international application
   - Box No. VIII Certain observations on the international application

Date of submission of the demand
21 June 2017

Date of completion of this report
4 December 2017

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Form PCT/IPEA/409 (Cover sheet) (July 2014)
1. With regard to the **language**, this report has been established on the basis of:
   - [X] The international application in the language in which it was filed:
   - [ ] A translation of the international application into , which is the language of a translation furnished for the purposes of:
     - [ ] international search (under Rules 12.3(a) and 23.1 (b)).
     - [ ] publication of the international application (under Rule 12.4(a)).
     - [ ] international preliminary examination (Rules 55.2(a) and/or 55.3(a) and (b)).

2. With regard to the **elements** of the international application, this report is based on (**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 not annexed to this report**):
   - [X] the international application as originally filed/furnished, or
   - [ ] the description: pages , as originally filed/furnished
     - pages , received by this Authority on with the letter of
   - [ ] the claims: pages , as originally filed/furnished
     - pages , as amended (together with any statement) under Article 19,
     - pages , received by this Authority on with the letter of
   - [ ] the drawings: pages , as originally filed/furnished
     - pages , received by this Authority on with the letter of
   - [ ] a sequence listing - see Supplemental Box Relating to Sequence Listing.

3. [ ] The amendments have resulted in the cancellation of:
   - [ ] the description, pages
   - [ ] the claims, Nos.
   - [ ] the drawings, sheets/figs
   - [ ] the sequence listing (specify):

4. [ ] This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
   - [ ] the description, pages
   - [ ] the claims, Nos.
   - [ ] the drawings, sheets/figs
   - [ ] the sequence listing (specify):

5. [ ] This report has been established:
   - [ ] taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
   - [ ] without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.4bis and 70.2(e)).

6. With regard to top-up searches (Rules 66.1ter and 70.2(f)):
   - [ ] A top-up search was carried out by this Authority on (date).
   - [ ] Additional relevant documents have been discovered during the top-up search.
   - [X] No top-up search was carried out by this Authority because it would serve no useful purpose.

7. [ ] Supplementary international search report(s) from Authority(ies)
   - [ ] has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

*If item 4 applies, some or all of those sheets may be marked "superseeded."
Box No. V  | Reasoned statement under Article 35(2) with regard to novelty, inventive step and industrial applicability; citations and explanations supporting such statement
---|---
1. Statement  |  
Novelty (N)  | Claims 1 to 17 | YES  
Claims NONE | NO  
Inventive step (IS)  | Claims 1 to 17 | YES  
Claims NONE | NO  
Industrial applicability (IA)  | Claims 1 to 17 | YES  
Claims NONE | NO  

2. CITATIONS AND EXPLANATIONS:

CITATIONS

NOVELTY (N)
Claims 1 to 17 meet the criteria set forth in PCT Article 33(2) for novelty. The prior art published before the priority date does not disclose a sensing system for detecting a substance in a dialysate comprising a hydrophobic barrier capable of allowing the substance in the dialysate to equilibrate through the barrier and an interface between the barrier and a detector configured to allow transport of the gas following a concentration gradient of the gas along the interface. The closest art of D2 does not disclose a conduit between the ammonia sensor 140 and the hydrophobic membrane 150 which allows transport of the gas following a concentration gradient of the gas. Nor does the prior art disclose a deformable diaphragm in contact with the dialysate and configured to produce a back and forth gas movement within the interface in response to fluid pressure variations within the dialysate.

INVENTIVE STEP (IS)
Claims 1 to 17 meet the criteria set out in PCT Article 33(3) with regard to the requirement of Inventive Step because the prior art does not obviously suggest to a person skilled in the art a sensing system for detecting a substance in a dialysate comprising a hydrophobic barrier capable of allowing the substance in the dialysate to equilibrate through the barrier and an interface between the barrier and a detector configured to allow transport of the gas following a concentration gradient of the gas along the interface. Nor does the prior art obviously suggest a deformable diaphragm in contact with the dialysate and configured to produce a back and forth gas movement within the interface in response to fluid pressure variations within the dialysate.

INDUSTRIAL APPLICABILITY (IA)
The invention defined in claims 1 to 17 is considered to meet the requirements of Industrial Applicability under Article 33(4) of the PCT because it can be made by, or used in, industry.