PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing *(day/month/year)*	28. 04. 2014
Applicant's or agent's file reference 671894	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/JP2014/054554	25.02.2014	15.05.2013

International Patent Classification (IPC) or both national classification and IPC
C02F1/48(2006.01)i

Applicant
SHARP KABUSHIKI KAISHA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I — Basis of the opinion
- ☐ 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 Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or 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

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2014/054554

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:

   ☒ 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 (Rules 12.3(a) and 23.1(b)).

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing filed or furnished:

   a. (means)

      ☐ on paper

      ☐ in electronic form

   b. (time)

      ☐ in the international application as filed

      ☐ together with the international application in electronic form

      ☐ subsequently to this Authority for the purposes of search

4. ☐ In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/JP2014/054554

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)	Claims	1-7	YES
	Claims		NO
Inventive step (IS)	Claims		YES
	Claims	1-7	NO
Industrial applicability (IA)	Claims	1-7	YES
	Claims		NO

2. Citations and explanations:

Document 1: JP 2000-176453 A (ORGANO CORP.) 27 June 2000, entire text, all drawings

Document 2: JP 2001-70947 A (ORGANO CORP.) 21 March 2001, entire text, all drawings

Document 3: JP 2000-91169 A (THE KANSAI COKE AND CHEMICALS CO., LTD.) 31 March 2000, paragraph [0011]

Document 4: JP 11-319838 A (KURITA WATER INDUSTRIES LTD.) 24 November 1999, entire text, all drawings

Document 5: JP 6-325983 A (THE KANSAI COKE AND CHEMICALS CO., LTD.) 25 November 1994, entire text, all drawings

Document 6: JP 2002-273439 A (KURITA WATER INDUSTRIES LTD) 24 September 2002, paragraphs [0022]-[0039]

The invention as in claims 1 and 2 does not involve an inventive step in the light of document 1 cited in the ISR. Document 1 (claims 1-3) discloses a flow-through capacitor that absorbs and desorbs ions in an aqueous

solution through application of voltage wherein the timing of desalination is gauged by measuring the quality of a desalinated solution and a concentrated solution. Document 1 (paragraphs [0014]-[0019], fig. 2, 3) indicates that the adsorption and desorption of ions is controlled by measuring electrical conductivity and discloses variation diagrams of electrical conductivity.

Consequently, a person skilled in the art could easily use the flow-through capacitor disclosed in document 1 as a functional water production device, use the change point at which the rate of change in electrical conductivity changes for determining the adsorption and desorption of ions, and take the point at which a non-linear change occurs as the change point.

The invention as in claims 3-7 does not involve an inventive step in the light of documents 1-3 cited in the ISR.

Document 2 (claims 1, 2) discloses a flow-through capacitor wherein the adsorption and desorption of ions are controlled by measuring the current value between electrodes. Thus, a person skilled in the art could easily compute electrical conductivity on the basis of change in electrical current in the flow-through capacitor disclosed in document 1, determine the change in the rate of electrical conductivity on the basis of linear change, and control the adsorption and desorption of ions.

Moreover, running a constant current in a flow-through capacitor is a common practice, as disclosed in, for example, document 3 (paragraph [0011]).

It is not considered particularly difficult to

Box No. V **Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

compute the quantity of adsorbed ions and the quantity of buffering ions on the basis of amperage of the electrical current, and the amount of time the current is running.