PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
TW INTERNATIONAL PATENT AND LAWFIRM

13F 114, Yeoksam-ro Gangnam-gu Seoul 06252 Republic of Korea

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)* **30 May 2018 (30.05.2018)**

Applicant's or agent's file reference
OPP18-002PCT

FOR FURTHER ACTION
See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/KR2018/001323	**31 January 2018 (31.01.2018)**	01 September 2017 (01.09.2017)

International Patent Classification (IPC) or both national classification and IPC
H01L 21/673(2006.01)i, H01L 31/18(2006.01)i

Applicant
HANWHA CORPORATION

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 43bis.1(a)(i) 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

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 66.1bis(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/KR	Date of completion of this opinion	Authorized officer
International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	30 May 2018 (30.05.2018)	CHOI, Sang Won Telephone No. +82-42-481-8291

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/KR2018/001323

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:

   a. ☐ forming part of the international application as filed:
      ☐ in the form of an Annex C/ST.25 text file.
      ☐ on paper or in the form of an image file.

   b. ☐ furnished together with the international application under PCT Rule 13*ter*.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.

   c. ☐ furnished subsequent to the international filing date for the purposes of international search only:
      ☐ in the form of an Annex C/ST.25 text file (Rule 13*ter*.1(a)).
      ☐ on paper or in the form of an image file (Rule 13*ter*.1(b) and Administrative Instructions, Section 713).

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 forming part of 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/KR2018/001323

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	2-9	YES
	Claims	1	NO
Inventive step (IS)	Claims	NONE	YES
	Claims	1-9	NO
Industrial applicability (IA)	Claims	1-9	YES
	Claims	NONE	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: TW 201704563 A (CENTROTHERM PHOTOVOLTAICS AG) 01 February 2017
D2: KR 10-2014-0100221 A (AP SYSTEMS INC.) 14 August 2014

1. Novelty and Inventive Step

1.1 Independent Claim 1

D1, which is considered to represent the most relevant state of the art, discloses a boat device (1) comprising: a plurality of plates (6), where a wafer accommodates in a gap between each plate (6); and three carrier elements (12) provided at each plate to hold an outside of the wafer (see paragraphs [0004], [0019], [0023] and figure 1). As all of the features of claim 1 are disclosed in D1, this claim is anticipated by D1. Therefore, claim 1 lacks novelty under PCT Article 33(2).

1.2 Dependent Claims 2-9

1.2.1 Claims 2-4, 6

The additional feature of claim 2, characterized in that a plate portion moves inside or outside of a chamber in a state of a plurality of wafers being stacked, wherein, when a crosswise direction of the plate portion where a first plate and a second plate are stacked is defined as a first direction, and a length wise direction of the plate portion where the first plate and the second plate are extended is defined as a second direction, a plurality of wafers is stacked along the second direction which is a lengthwise direction of each plate, and a plurality of wafers is stacked along the second direction corresponding to the number of plates, and the plurality of wafers is inputted into the chamber at one time and processed at one time while being stacked on the plate portion, would be easily conceived from the disclosure of D1 considering that the plates (6) move inside or outside of a processing chamber (38) in state of

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a plurality of wafers being held in the gap (see paragraphs [0051], [0077] and figures 1, 4, 12).

The additional feature of claim 3, characterized in that a first pin contacts one side or a left side of the wafer, a third pin contacts the other side or the right side of the wafer, and a second pin contacts a bottom side of the wafer, wherein the position is maintained by allowing the second pin to support a load of the wafer, and by allowing the first and third pins to prevent rotation of the wafer or to restrict the horizontal (left/right) movement, would be easily conceived from the disclosure of D1 considering that the three carrier elements (12) hold the outside of the wafer (see paragraph [0023] and figure 1).

The additional feature of claim 4, characterized in that at least two pins out of the first pin, the second pin and the third pin are connected to each electrode of the plate, and the pin includes a graphite material as an electrically conductive material, would be easily conceived from the disclosure of D1 considering that the plate (6) can be supplied with electric potential, wherein at least two carrier elements (12) are made of conductive material and are connected to each electrode of the plate (6) (see paragraphs [0009], [0024]).

The additional feature of claim 6, characterized in that the first pin, the second pin and the third pin are arranged at each plate in order to form an imaginary triangle having, as a vertex, a contact point contacting an outside of the wafer, and each plate partially cut plate pocket is formed among the first, second and third pins, wherein the plate pocket becomes a plasma flow path or a reaction gas flow path, would be easily conceived from the disclosure of D1 considering that the three carrier elements (12) are arranged at each plate in order to hold the outside of the wafer, wherein each plate has a hole (10) to process the wafer as a gas flow path (see paragraphs [0021], [0023] and figure 1).

Accordingly, claims 2-4, 6 would have been obvious over D1. Therefore, claims 2-4, 6 lack an inventive step under PCT Article 33(3).

1.2.2 Concerning Claims 5, 7-9

The additional feature of claim 5, characterized in that the first pin, the second pin and the third pin respectively mounted on each adjacent plate are so arranged as not to face each other, and each pin in zigzaggedly arranged along the first direction, which is a direction

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stacked with the plurality of plates, is merely a matter of design option in view of the combination of D1 considering that the three carrier elements (12) mounted on the plates (6) are so arranged as not to face each other (see paragraphs [0004], [0023] and figure 1) and D2 considering that an arrangement of support pins (431) and guide pins (432) can be modified in various ways (see paragraph [0045] and figure 4) by a person skilled in the art, and D1 and D2 are concerned with mutually related technical fields.

The additional feature of claim 7, characterized in that the first pin, the second pin and the third pin supporting the wafer stacked on a first plate are so arranged as not to face the first pin, the second pin and the third pin supporting the wafer stacked on a second plate adjacent to the first plate, and an imaginary triangle connecting the first pin, the second pin and the third pin supporting the wafer stacked with the first plate does not match to an imaginary triangle connecting the first pin, the second pin and the third pin supporting the wafer stacked with a second plate adjacent to the first plate, is merely a matter of design option in view of the combination of D1 considering that the three carrier elements (12) mounted on the plates (6) are so arranged as not to face each other (see paragraphs [0004], [0023] and figure 1) and D2 considering that the arrangement of the support pins (431) and the guide pins (432) can be modified in various ways (see paragraph [0045] and figure 4) by a person skilled in the art, and D1 and D2 are concerned with mutually related technical fields.

The additional feature of claim 8, characterized in that heights from a floor surface of the plate portion to the first pin are mutually different from the mutually adjacent first plate and second plate, is merely a matter of design option in view of the combination of D1 considering that the three carrier elements (12) mounted on the plates (6) are so arranged as not to face each other (see paragraphs [0004], [0023] and figure 1) and D2 considering that the arrangement of the support pins (431) and the guide pins (432) can be modified in various ways (see paragraph [0045] and figure 4) by a person skilled in the art, and D1 and D2 are concerned with mutually related technical fields.

The additional feature of claim 9, characterized in that the first pins respectively arranged at the mutually adjacent first plate and second plate are mutually different positions along the first direction arranged with the first plate and the second plate, is merely a matter of design option in view of the combination of D1 considering that the three carrier elements (12) mounted on the plates (6) are so arranged as not to face each other (see paragraphs [0004], [0023] and

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figure 1) and D2 considering that the arrangement of the support pins (431) and the guide pins (432) can be modified in various ways (see paragraph [0045] and figure 4) by a person skilled in the art, and D1 and D2 are concerned with mutually related technical fields.

Accordingly, claims 5, 7-9 would have been obvious over D1 in view of D2. Therefore, claims 5, 7-9 lack an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-9 are industrially applicable under PCT Article 33(4).