

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

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Date of mailing (day/month/year) 06 November 2018 (06.11.2018)
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Applicant's or agent's file reference LAM1P576WO	FOR FURTHER ACTION See paragraph 2 below	
International application No. PCT/US2018/042635	International filing date (day/month/year) 18 July 2018 (18.07.2018)	Priority date(day/month/year) 11 August 2017 (11.08.2017)
International Patent Classification (IPC) or both national classification and IPC H01L 21/677(2006.01)i, H01L 21/67(2006.01)i		
Applicant LAM RESEARCH 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 International Application Division Korean Intellectual Property Office 189 Cheongsa-ro, Seo-gu, Daejeon, 35208, Republic of Korea Facsimile No. +82-42-481-8578	Date of completion of this opinion 06 November 2018 (06.11.2018)	Authorized officer CHOI, Sang Won Telephone No. +82-42-481-8291
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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US2018/042635

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*. I(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*. I(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*. I(a)).
 - on paper or in the form of an image file (Rule 13*ter*. I(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/US2018/042635

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	<u>4-10,12-17</u>	YES
	Claims	<u>1-3,11</u>	NO
Inventive step (IS)	Claims	<u>NONE</u>	YES
	Claims	<u>1-17</u>	NO
Industrial applicability (IA)	Claims	<u>1-17</u>	YES
	Claims	<u>NONE</u>	NO

2. Citations and explanations :

Reference is made to the following documents:

D1: US 2003-0063965 A1 (JOHN GILES LANGAN et al.) 03 April 2003

D2: JP 09-027542 A (HITACHI LTD. et al.) 28 January 1997

1. Novelty and Inventive Step

1.1. Claims 1-11

1.1.1. Independent Claim: Claim 1

D1, which is considered to represent the most relevant state of the art, discloses a mobile, self-evacuating, micro-environment system for transit and storage of substrates between two or more processing chambers in manufacture of semiconductor devices, the system comprising: a vacuum-sealed container (12) located on a mobile cart and having an internal volume adapted to hold a plurality of substrates (see paragraph [0036], claim 1 and figure 2 in D1); cryogenic molecular sieve sorption pumps (13, 14) capable of pumping down the container (12) to a base pressure of about 10⁻² Torr, wherein the pumps (13, 14) are located on the mobile cart (see paragraphs [0029], [0036] and figure 2 in D1); and valves (15, 16, 17), wherein the sorption pump (13) performs initial pump-down of the container (12) when the valves (15, 16) are opened, and the sorption pump (14) then pumps the container (12) to the base pressure of about 10⁻² Torr when valves (17, 16) are opened (see paragraph [0036] and figure 2 in D1). As all 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).

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1.1.2. Dependent Claims: Claims 2-11

1.1.2.1. Claims 2, 3 and 11

The additional feature of claim 2 is identical to the feature of D1 of a gate-type docking valve (23) designed to mate with a corresponding valve (24) on a robot chamber or processing tool (32) such that during a docking process, the two valves are securely clamped together, forming a vacuum-tight seal (see paragraph [0040] and figure 2 in D1).

The additional feature of claim 3 is identical to the feature of D1 of the cryogenic molecular sieve sorption pumps (13, 14) (see paragraph [0036] and figure 2 in D1).

The additional feature of claim 11 is identical to the feature of D1 of opening the gate-type docking valve (23) to permit unloading/loading of wafers to the robot chamber or processing tool (32) and closing the docking valve (23) to seal the container (12) (see paragraphs [0031], [0040] and figure 2 in D1) .

As all the features of claims 2, 3 and 11 are disclosed in D1, these claims are anticipated by D1. Therefore, claims 2, 3 and 11 lack novelty under PCT Article 33(2).

1.1.2.2. Claims 4, 7, 9 and 10

The additional feature of claim 4 is merely a variation of the disclosure of D1 (boiled-off gaseous nitrogen can be used as a pure, inert gas to re-pressurize (vent) the container (12) or inter-gate valve space when necessary, see paragraph [0042] and figure 2 in D1), and a person skilled in the art would arrive at the claimed invention by general experimentation alone without exercising any ingenuity.

The additional feature of claim 7 is merely a matter of design option in view of the cryogenic molecular sieve sorption pumps (13, 14) capable of pumping down the container (12) of D1 (see paragraphs [0029], [0036] and figure 2 in D1).

The additional feature of claim 9 is virtually suggested by D1 (pressure gauges

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(33) are monitored by an on-board computer (27) to control the sequencing of the valves and pumps, see paragraph [0041] and figure 2 in D1).

The additional feature of claim 10 is merely a variation of the disclosure of D1 (the pressure gauges (33), see paragraph [0041] and figure 2 in D1), and a person skilled in the art would arrive at the claimed invention by general experimentation alone without exercising any ingenuity.

Accordingly, claims 4, 7, 9 and 10 would have been obvious over D1. Therefore, claims 4, 7, 9 and 10 lack an inventive step under PCT Article 33(3).

1.1.2.3. Claims 5, 6 and 8

The additional features of claims 5 and 6 can be easily derived from the disclosure of D2 considering that a carrying container flange (14) is connected to a connecting pipe flange (13); a connecting pipe (10) is evacuated by using a turbo pump (11) and a rotary pump (12); and the carrying container flange (14) is disconnected from the connecting pipe flange (13) after transporting a wafer (2) (see paragraphs [0023]-[0025] and figure 2 in D2).

The additional feature of claim 8 is identical to the feature of D2 that a vacuum chamber (1) is made of Al (see paragraphs [0017], [0027] and figure 2 in D2).

Accordingly, claims 5, 6 and 8 would have been obvious over a combination of D1 and D2. Therefore, claims 5, 6 and 8 lack an inventive step under PCT Article 33(3).

1.2. Claims 12-17

1.2.1. Independent Claim: Claim 12

D2, which is considered to be the closest prior art to the subject matter of claim 12, discloses a method for transporting a wafer (2), the method comprising: connecting a carrying container flange (14) to a connecting pipe flange (13) (see paragraph [0023] and figure 2 in D2); evacuating a connecting pipe (10) and opening a gate valve (9) and a valve (3) of a carrying container to make the same vacuum chamber (see paragraph [0024] and figure 2 in D2); transferring the wafer (2) from a load lock chamber (8) to the carrying container; closing the valve (3) of the

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carrying container and disconnecting the carrying container flange (14) from the connecting pipe flange (13) (see paragraph [0025] and figure 2 in D2); using a getter pump (5) to maintain vacuum under 10^{-8} Pa during transportation (see paragraphs [0014], [0018], [0026] and figure 2 in D2); and transporting the carrying container to the next processing apparatus (see paragraph [0025] and figure 2 in D2).

Claim 12 differs from D2 in that a method for transporting a wafer from a first wafer processing device to a second wafer processing device comprises: docking a portable vacuum transfer pod to a second docking station; and transferring at least one wafer from the portable vacuum transfer pod through the second docking station. However, these different features can be easily derived from the disclosure of D2 considering transporting the carrying container to the next processing apparatus; and connecting the carrying container flange (14) to the connecting pipe flange (13) (see paragraphs [0023], [0025] and figure 2 in D2). Accordingly, claim 12 would have been obvious over D2. Therefore, claim 12 lacks an inventive step under PCT Article 33(3).

1.2.2. Dependent Claims: Claims 13-17

1.2.2.1. Claims 13, 15 and 17

The additional feature of claim 13 is identical to the feature of D2 of the getter pump (5) (see paragraphs [0014], [0018], [0026] and figure 2 in D2).

The additional feature of claim 15 can be easily derived from the disclosure of D2 considering that the carrying container flange (14) is connected to the connecting pipe flange (13); the connecting pipe (10) is evacuated by using a turbo pump (11) and a rotary pump (12); and the carrying container flange (14) is disconnected from the connecting pipe flange (13) after transporting the wafer (2) (see paragraphs [0023]-[0025] and figure 2 in D2).

The additional feature of claim 17 can be easily derived from the disclosure of D2 considering that the inside of the carrying container can be maintained in a high vacuum state for a long time; and the getter pump (5) does not need power during vacuum holding (see paragraphs [0014], [0016] and figure 2 in D2).

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Accordingly, claims 13, 15 and 17 would have been obvious over D2. Therefore, claims 13, 15 and 17 lack an inventive step under PCT Article 33(3).

1.2.2.2. Claims 14 and 16

The additional feature of claim 14 is merely a variation of the disclosure of D1 (a sorption pump (13) performs initial pump-down of a vacuum-sealed container (12) when valves (15, 16) are opened, and a sorption pump (14) then pumps the container (12) to a base pressure of about 10⁻² Torr when valves (17, 16) are opened, see paragraph [0036] and figure 2 in D1), and a person skilled in the art would arrive at the claimed invention by general experimentation alone without exercising any ingenuity.

The additional feature of claim 16 is merely a variation of the disclosure of D1 (boiled-off gaseous nitrogen can be used as a pure, inert gas to re-pressurize (vent) the container (12) or inter-gate valve space when necessary, see paragraph [0042] and figure 2 in D1), and a person skilled in the art would arrive at the claimed invention by general experimentation alone without exercising any ingenuity.

Accordingly, claims 14 and 16 would have been obvious over a combination of D2 and D1. Therefore, claims 14 and 16 lack an inventive step under PCT Article 33(3).

2. Industrial Applicability

Claims 1-17 are industrially applicable under PCT Article 33(4).