

SUBSTRATE TREATING APPARATUS

BACKGROUND OF THE INVENTION

[0001] The present disclosure relates to an apparatus for treating a substrate.

5 **[0002]** In a method for manufacturing a semiconductor device or a liquid crystal display, a variety of processes such as a photolithography process, an etching process, an ashing process, an ion injection process, a film deposition process, and a cleaning process are performed on a substrate. The photolithography process among these processes is for forming a circuit pattern on a substrate. The photolithography
10 process includes a coating process, an exposing process, and a developing process which are performed sequentially. The coating process is for applying a photoresist on a substrate, the exposing process is for exposing the circuit pattern on the substrate on which the photoresist is formed, and the developing process is for selectively developing a photoresist layer portion of the substrate.

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[0003] SUMMARY OF THE INVENTION

[0004] The present disclosure provides a substrate treating apparatus capable of efficiently treating a substrate.

[0005] Example embodiments of the inventive concept may provide a substrate
20 treating apparatus which comprise an equipment front end module for carrying in a substrate for a treatment and carrying out the substrate which has been treated, a processing module for processing the substrate, a transfer chamber for carrying in and out the substrate to the processing module and controlling an oxygen concentration, and a loadlock chamber positioned between the equipment front and

end module and the transfer chamber for providing a path for the substrate to be moved and controlling an oxygen concentration.

[0006] In example embodiments, in the loadlock chamber a sensor may be provided to detect oxygen concentration therein.

5 **[0007]** In example embodiments, the loadlock chamber may comprise a carry in chamber for providing a path for the substrate carried in from the equipment front and end module to the transfer chamber and a carry out chamber for providing a path for the substrate carried out from the transfer chamber to the equipment front and end module, wherein an oxygen concentration of the carry in chamber and the carry out
10 chamber may be controlled independently.

[0008] In example embodiments, the carry in chamber may be provided with a carry in sensor for detecting an oxygen concentration within the carry in chamber and a carry out sensor for detecting an oxygen concentration within the carry out chamber.

[0009] In example embodiments, the carry in chamber may be connected to a carry
15 in supply line for supplying an inert gas and a carry in exhaust line for exhausting a gas.

[0010] In example embodiments, a supply of the inert gas or an exhaust of the gas may be controlled depending on an oxygen concentration detected from the carry in sensor.

20 **[0011]** In example embodiments, the carry out chamber may be connected to a carry out supply line for supplying an inert gas and a carry out exhaust line for exhausting a gas.

[0012] In example embodiments, a supply of the inert gas or an exhaust of the gas may be controlled depending on an oxygen concentration detected from the carry out
25 sensor.

[0013] In example embodiments, the transfer chamber may be provided with a sensor for detecting an oxygen concentration within the transfer chamber.

[0014] In example embodiments, the transfer chamber may be connected to a supply line for supplying an inert gas and an exhaust line for exhausting a gas,
5 wherein a supply of the inert gas or an exhaust of the gas may be controlled depending on an oxygen concentration detected from the sensor.

[0015] In example embodiments, a door for opening and closing a path where the substrate is transferred may be provided between the equipment front and end module and the loadlock chamber, or between the loadlock chamber and the transfer
10 chamber, or between the transfer chamber and the processing module.

[0016] In example embodiments, the door may comprise a shield in which a discharge hole is formed to discharge an inert gas toward the outer surface of the path when the path is opened and provided as a plate form, and a driver for moving the shield.

15 **[0017]** In example embodiments, a plurality of the discharge holes may be formed to the widthwise direction of the path corresponding to the width of the path.

[0018] In example embodiments, a distribution space connected to the plurality of the discharge holes may be formed inside of the shield.

[0019] In example embodiments, the path is arranged vertically, respectively, and
20 the door may comprise a first door for opening and closing a top path and a second door for opening and closing a bottom path.

[0020] In example embodiments, the first door moves to a top when the top path is opened and the second door moves to a bottom when the bottom path is opened.

[0021] In example embodiments, a first discharge hole of the first door and a second
25 discharge hole of the second door may be formed in a position deviate from an array

where the two doors are arranged vertically to each other when viewed from a lateral side.

BRIEF DESCRIPTION OF THE DRAWINGS

5 **[0022]** FIG. 1 is a plan view of an apparatus for treating a substrate in accordance with an embodiment of the present invention.

[0023] FIG. 2 is a side view of a carry in chamber and a transfer chamber.

[0024] FIG. 3 is a side view of a carry out chamber and a transfer chamber.

[0025] FIG. 4 shows correlation of oxygen concentration of a transfer chamber or a
10 loadlock chamber therein in accordance with flow of an inert gas provided within the transfer chamber or the loadlock chamber.

[0026] FIG. 5 shows correlation oxygen concentration of a transfer chamber or a loadlock chamber therein in accordance with pressure of a gas exhausted within the transfer chamber or the loadlock chamber.

15 **[0027]** FIG. 6 shows thickness of oxide film of a substrate depending on amount of oxygen.

[0028] FIG. 7 is a front view of a door.

[0029] FIG. 8 is a rear view of a door of FIG. 7.

[0030] FIG. 9 is a perspective view of a disassembled door.

20 **[0031]** FIG. 10 shows movement of a door when a gate is opened.

[0032] FIG. 11 is a side view of a door movement in accordance with another embodiment of the present invention.

DETAILED DESCRIPTION

[0033] Various example embodiments will be described more fully hereinafter with
25 reference to the accompanying drawings, in which some example embodiments are

shown. The present invention may, however, be embodied in different forms and should not be construed as limited to the embodiments set forth herein. Rather, these embodiments are provided so that this disclosure will be thorough and complete, and will fully convey the scope of the present invention to those skilled in the art.

5 Therefore, features of the drawings are exaggerated to emphasize definite explanation.

[0034] FIG. 1 is a plan view of an apparatus for treating a substrate in accordance with an embodiment of the present invention.

[0035] Referring to FIG.1, a substrate treating apparatus 1 includes an equipment
10 front end module (EFEM) 20 and a processing unit 30. The EFEM 20 and the process unit 30 are arranged in one direction. A direction which the EFEM 20 and the process unit 30 are arranged is referred to as a first direction X, when viewed from a top side, a direction perpendicular to the first direction X is called as a second direction Y.

15 **[0036]** The EFEM 20 carries in a substrate for treatment within the substrate treating apparatus 1 and carries out the substrate, finished with the treatment, from the substrate treating apparatus 1. The EFEM 20 includes a load port 10 and a transfer frame 21. The load port 10 may be arranged in front of the EFEM 20 along the first direction X. The load port 10 has a plurality of supporters 6. Each supporters 6
20 are arranged along the second direction Y and a carrier 4 (for example, cassette, FOUP, and so on) having a substrate W that will be provided to a process and a substrate W that has finished with a treatment is positioned. In the carrier 4, a substrate W that will be provided to a process and a substrate W that has finished with a treatment are provided. The transfer frame 21 is arranged between the load
25 port 10 and the processing unit 30. The transfer frame 21 is arranged therein and

includes a first transfer robot 25 for transferring the substrate W between the load port 10 and the processing unit 30. The first transfer robot 25 may be provided movably along a transfer rail 27 provided along the second direction Y.

[0037] The processing unit 30 includes a loadlock chamber 40, a transfer chamber 50, and a processing module 60.

[0038] The loadlock chamber 40 is arranged adjacently to the transfer frame 21. In an example, the loadlock chamber 40 may be arranged between the transfer chamber 50 and the EFEM 20. The loadlock chamber 40 is provided to be able to control oxygen concentration.

[0039] The loadlock chamber 40 may include a carry in chamber 41 and a carry out chamber 42. The carry in chamber 41 provides a standby space for a substrate W to be provided in a treatment while transferring to the processing module 60. The carry out chamber 42 provides a standby space for a substrate W finished with a treatment before transferred to the EFEM 20.

[0040] In the carry in chamber 41 and the carry out chamber 42, a gate G1, G2 are provided, respectively. A loadlock gate G1, G2 includes a front gate G1 positioned in a path connecting to the EFEM 20 and a back gate G2 positioned in a path connecting to the transfer chamber 50 which will be described later. The loadlock gate G1, G2 is provided as a path for a substrate to move. The loadlock gate G1, G2 may be opened and closed by a door 600, which will be described later. The carry in chamber 41 and the carry out chamber 42 are provided to be able to control oxygen concentration therein.

[0041] The transfer chamber 50 is arranged adjacently to the loadlock chamber 40. When viewed from a top side, the transfer chamber 50 may have a polygonal body. In an example, when viewed from a top side, the transfer chamber may have a

pentagonal body. In the outer surface of the body, the loadlock chamber 40 and a plurality of processing modules 60 are arranged along the circumference of the body. In each of the lateral wall of the body, a passageway for the substrate W to enter is formed and the path connects the transfer chamber 50, the loadlock chamber 40 or the processing module 60. Inner space of the transfer chamber 50, a second transfer robot 53 for transferring the substrate W is arranged. The second transfer robot 53 transfers untreated substrate W which standbys in the carry in chamber 41 to the processing module 60 or transfers treated substrate W from the processing module 60 to the carry out chamber 42. And, in order to provide the substrate W in a plurality of processing modules sequentially, the substrate W is transferred between the processing modules 60. Like the example of figure 1, when the transfer chamber 50 has a pentagonal body, the loadlock chamber 40 may be arranged in a lateral wall adjacent to the EFEM 20 and the processing modules 60 may be arranged in the rest of the lateral wall sequentially. The transfer chamber 50 may be provided with various forms depending on not only on the above forms but also on the number of required processing module. The transfer chamber 50 is provided to be able to control oxygen concentration therein.

[0042] The processing module 60 is arranged along circumference of the transfer chamber 50. A plurality of processing modules 60 may be provided. The substrate W may be treated in each of the processing modules 60. The processing module 60 receives the substrate W from the second transfer robot 53, treats the substrate W, and provides the treated substrate W to the second transfer robot 53. In a path where a substrate is transferred between the processing module 60 and the transfer chamber 50, a gate G3 is provided. A treatment processed in each of the processing modules 60 may be the same or different. A process performed by the processing module 60

may be a process during producing a semiconductor device or a display panel using the substrate W. In an example, one or more among processing modules 60 may comprise a plasma module for treating the substrate W using plasma.

[0043] FIG. 2 is a side view of a carry in chamber and a transfer chamber, and FIG.

5 3 is a side view of a carry out chamber and a transfer chamber.

[0044] Referring to FIGS. 2 and 3, a gas supply member 200 is connected to the loadlock chamber 40 and the transfer chamber 50. The gas supply member 200 provides an inert gas to the loadlock chamber 40 and the transfer chamber 50. In an

example, the inert gas provided by the gas supply member 200 may be nitrogen. In
10 an embodiment of figures, the carry in chamber 41, the carry out chamber 42 and the transfer chamber 50 are connected to one gas supply member 200. However, they may be connected to different gas supply members, respectively, or only one of them may be connected to different gas supply member.

[0045] A carry in supply line 210 for supplying an inert gas to the carry in chamber

15 41 may be provided as a structure that can control a supply of inert gas and/or the amount of provided inert gas. For example, a carry in supply control device 211 for opening and closing the carry in supply line 210 or controlling flow may be provided in the carry in supply line 210. The carry in supply control device 211 may be a valve, MFC (mass flow controller), and so on. A carry in sensor 110 may be
20 provided in a carry in housing 100 of the carry in chamber 41. The carry in sensor 110 may detect oxygen concentration in the carry in chamber 41.

[0046] A carry out supply line 220 for supplying an inert gas to the carry out chamber 42 may be provided as a structure whether inert gas is provided or not and/or as a structure that amount of provided inert gas is controlled. For example, a

25 carry out supply control device 221 for opening and closing the carry out supply line

220 or controlling flow may be provided in the carry out supply line 220. The carry out supply control device 221 may be a valve, MFC (mass flow controller), and so on. A carry out sensor 112 may be provided in a carry out housing 102 of the carry out chamber 42. The carry out sensor 112 may detect oxygen concentration in the carry out chamber 42.

[0047] A supply line 230 for supplying an inert gas to the transfer chamber 50 may be provided as a structure whether inert gas is provided or not and/or as a structure that amount of provided inert gas is controlled. For example, a supply control device 231 for opening and closing the supply line 230 or controlling flow may be provided in the supply line 230. The control device 231 may be a valve, MFC (mass flow controller), and so on. A sensor 510 may be provided in a housing 500 of the transfer chamber 50. The sensor 510 may detect oxygen concentration within the transfer chamber 50.

[0048] The loadlock chamber 40 and the transfer chamber 50 are connected to an exhaust device 300. The exhaust device 300 exhausts a gas of the loadlock chamber 40 and the transfer chamber 50 therein. In an embodiment of figures, the carry in chamber 41, the carry out chamber 42 and the transfer chamber 50 are connected to the one exhaust device 300. However, they may be connected to each of the exhaust devices 300 or only one of them may be connected to different exhaust device 300.

[0049] A carry in exhaust line 310 for exhausting a gas to the carry in chamber 41 may be provided as a structure whether gas is exhausted or not and/or as a structure that amount of exhausted gas is controlled. For example, a carry in exhaust control device 311 for opening and closing the carry in exhaust line 310 or controlling flow may be provided in the carry in exhaust line 310. The carry in exhaust control device 311 may be a valve, MFC (mass flow controller), and so on.

[0050] A carry out exhaust line 320 for exhausting a gas to the carry out chamber 42 may be provided as a structure whether gas is exhausted or not and/or as a structure that amount of exhausted gas is controlled. For example, a carry out exhaust control device 321 for opening and closing the carry out exhaust line 320 or controlling flow
5 may be provided in the carry out exhaust line 320. The carry out exhaust control device 321 may be a valve, MFC (mass flow controller), and so on.

[0051] An exhaust line 330 for exhausting a gas to the transfer chamber 50 may be provided as a structure whether gas is exhausted or not and/or as a structure that amount of exhausted gas is controlled. For example, an exhaust control device 331
10 for opening and closing the exhaust line 330 or controlling flow may be provided in the exhaust line 330. The exhaust control device 331 may be a valve, MFC (mass flow controller), and so on.

[0052] FIG. 4 shows correlation of oxygen concentration of a transfer chamber or a loadlock chamber therein in accordance with flow of an inert gas provided in the
15 transfer chamber or the loadlock chamber.

[0053] Oxygen may flow into the loadlock chamber 40 or the transfer chamber 50. Specifically, the front gate G1 is opened during carrying in the substrate from the EFEM 20 to the carry in chamber 41 or during carrying out the substrate from the carry out chamber 42 to the EFEM 20 and outside air of a substrate treating
20 apparatus 10 may be flowed through the front gate G1. In here, oxygen included in the outside air is flowed together. And the outside air including oxygen may be flowed into the transfer chamber 50 when a back gate G2 is opened depending on a process of transferring the substrate.

[0054] When a flow of inert gas provided to the loadlock chamber 40 increases,
25 amount of oxygen in the loadlock chamber 40 may be decreased. This is effect of

pressure increased in the loadlock chamber 40 by flow of inert gas, outside air inflow decreased according to supplied inert gas flow, and so on. With a similar reason to the loadlock chamber 40, amount of oxygen in the transfer chamber 50 may be decreased when amount of supplied inert gas increases.

5 **[0055]** FIG. 5 shows correlation oxygen concentration of a transfer chamber or a loadlock chamber therein in accordance with pressure of a gas exhausted within the transfer chamber or the loadlock chamber.

[0056] When a pressure for exhausting a gas in the loadlock chamber 40 increases, amount of oxygen in the loadlock chamber 40 may be increased. This may be
10 explained in that when a pressure for exhausting a gas increases, amount of exhausted gas increases, amount of gas and pressure in the loadlock chamber 40 decreases and thereby amount of outside air flow increases. With a similar reason to the loadlock chamber 40, amount of oxygen in the transfer chamber 50 may be decreased when amount of exhausted gas pressure increases.

15 **[0057]** FIG. 6 shows thickness of oxide film of a substrate depending on amount of oxygen.

[0058] The substrate may be oxidized by surrounding oxygen. In here, when other requirement is maintained the same, thickness of an oxide film depending on oxygen concentration may have similar correlation with the root function graph like FIG. 6.
20 Therefore, the oxide film with wanted thickness may be formed by controlling oxygen concentration where the substrate is place without special treatment in the substrate.

[0059] Hereinafter explains specifically about a method for forming an oxide film in the substrate with the substrate treating apparatus 1 in accordance with an
25 embodiment of the present invention.

[0060] The carry in supply line 210 provides inert gas to the carry in chamber 41. Inert gas may be a state to be provided inside of the carry in chamber 41 irrespective of opening status of the front gate G1 and back gate G2. And carry in exhaust line 310 exhausts a gas inside of the carry in chamber 41. Gas exhaustion of the carry in chamber 41 is performed when the front gate G1 is closed, and may be stopped when the front gate G1 is opened. Therefore, outside air inflow by gas exhaustion in the carry in chamber 41 may be decreased. Also, gas exhaustion in the carry in chamber 41 may be performed when the front gate G1 is opened and closed. In here, amount of gas exhaustion in the carry in chamber 41 may be controlled depending on an opening status of the front gate G1 to control oxygen concentration in the carry in chamber 41 according to inflow control of outside gas. In an example, amount of gas exhaustion in the carry in chamber 41 may be controlled to be decreasing when the front gate G1 is opened than when the front gate G1 is closed. Also, inert gas supply through the carry in supply line 210 may be controlled depending on oxygen concentration detected in the carry in sensor 110. Also, gas exhaustion through the carry in exhaust line 310 may be controlled depending on oxygen concentration detected in the carry in sensor 110.

[0061] The front gate G1 of the carry in chamber 41 is opened for carrying in the substrate from the EFEM 20 and closed after carrying in the substrate. Inert gas supply through the carry in supply line 210 and gas exhaustion through the carry in exhaust line 310 may be controlled for a pressure of the carry in chamber 41 to maintain setting range. In an example, the carry in chamber 41 may be operated within 1torr to 850torr.

[0062] After carrying in the substrate to the carry in chamber 41 and setting time passes, the back gate G2 is opened and the substrate is transferred to the transfer

chamber 50. After that, when the substrate is carried out the back gate G2 may be closed. Supplying inert gas to the carry in chamber 41 and exhausting gas of the carry in chamber 41 may be performed without an opening status of the back gate G2.

[0063] After the substrate is carried into the carry in chamber 41, time consumed to be carried out to the transfer chamber 50 may be managed within the setting time range. Also, oxygen concentration within the carry in chamber 41 may be controlled by controlling supplied inert gas and/or amount of gas exhaustion. Therefore, before treating in the processing module, a thickness of oxide film formed on the substrate may be controlled through control of oxygen concentration within the carry in chamber 41.

[0064] The supply line 230 supplies inert gas to the transfer chamber 50. Inert gas may be a state to be provided within the transfer chamber 50 irrespective of opening status of the back gate G2 and a gate G3. Amount of supplied inert gas may be controlled for controlling oxygen concentration detected in the sensor 510. In an example, amount of supplied inert gas may be decreased when the oxygen concentration within the transfer chamber 50 is lower than the setting concentration. Also, when the oxygen concentration within the transfer chamber 50 is higher than the setting concentration, amount of supplied inert gas may be increased.

[0065] The exhaust line 330 exhausts a gas within the transfer chamber 50. Gas exhaustion may be performed without opening status of the back gate G2 and a gate. Amount of exhausting gas may be controlled for controlling oxygen concentration detected in the sensor 510. In an example, amount of supplied inert gas may be decreased when the oxygen concentration within the transfer chamber 50 is lower than the setting concentration. Also, when the oxygen concentration within the

transfer chamber 50 is higher than the setting concentration, amount of supplied inert gas may be increased.

[0066] Supply of inert gas through the in supply line 230 and gas exhaustion through the exhaust line 330 may be controlled for a pressure of the carry in chamber 41 to maintain setting range. In an example, the transfer chamber 50 may be operated within 700torr to 850torr. After that the substrate is treated in more than one processing module and then carried out to the carry out chamber 42.

[0067] A time consumed for an untreated substrate to be carried into the transfer chamber 50 and carried out to the processing module 60 and/or a time consumed for a treated substrate to be carried into the processing module 60 to the transfer chamber 50 and carried out to the carry out module 42 may be managed within the setting time range. Also, oxygen concentration within the transfer chamber 50 may be controlled by controlling the amount of supplied inert gas and/or exhausted gas. Therefore, the substrate may control thickness of oxide film generated in the transfer chamber 50 after treated in the processing module 60 and/or thickness of oxide film generated in the transfer chamber 50 before treated in the processing module 60 through controlling oxygen concentration within the transfer chamber 50.

[0068] The carry out supply line 220 supplies inert gas to the carry out chamber 42. Inert gas may be a state to be provided within the carry out chamber 42 irrespective of opening status of the front gate G1 and the back gate G2. And carry out exhaust line 320 exhausts a gas within the carry out chamber 42. Gas exhaustion of the carry out chamber 42 is performed when the front gate G1 is closed, and may be stopped when the front gate G1 is opened. Therefore, outside air inflow by gas exhaustion in the carry out chamber 42 may be decreased. Also, gas exhaustion in the carry out chamber 42 may be performed when the front gate G1 is opened and closed. In here,

amount of gas exhaustion in the carry out chamber 42 may be controlled depending on an opening status of the front gate G1 to control oxygen concentration in the carry out chamber 42 according to inflow control of outside gas. In an example, amount of gas exhaustion in the carry out chamber 42 may be controlled to be decreasing when

5 the front gate G1 is opened than when the front gate G1 is closed.

[0069] Also, inert gas supply through the carry out supply line 220 may be controlled depending on oxygen concentration detected in the carry out sensor 112. Also, gas exhaustion through the carry out exhaust line 320 may be controlled depending on oxygen concentration detected in the carry out sensor 112.

10 **[0070]** The back gate G2 of the carry out chamber 42 is opened for carrying in the substrate from the transfer chamber 50 and closed after carrying in the substrate. Supplying inert gas to the carry out chamber 42 and exhausting gas of the carry out chamber 42 may be performed without an opening status of the back gate G2. Inert gas supply through the carry out supply line 220 and gas exhaustion through the

15 carry out exhaust line 320 may be controlled for a pressure of the carry out chamber 42 to maintain setting range. In an example, the carry out chamber 42 may be operated within 1 torr to 850 torr.

[0071] After carrying in the substrate to the carry out chamber 42 and setting time passes, the front gate G1 is opened and the substrate is transferred to the EFEM 20.

20 After that, when the substrate is carried out the front gate G1 is closed.

[0072] After the substrate is carried into the carry out chamber 42, time consumed to be carried out to the EFEM 20 may be managed within the setting time range. Also, oxygen concentration within the carry out chamber 42 may be controlled by controlling supplied inert gas and/or amount of gas exhaustion.

Therefore, after treating in the processing module, a thickness of oxide film formed on the substrate may be controlled through control of oxygen concentration within the carry out chamber 42.

[0073] FIG. 7 is a front view of a door and FIG. 8 is a rear view of a door of FIG. 7.

5 **[0074]** A door 600 may be provided to open and close the front gate G1, the back gate G2, or the gate G3. The door 600 comprises a shield 610 and a driver 620.

[0075] The shield 610 may be provided as a plate form having setting thickness. The driver 620 may be connected to outer side of the shield 610 and move the shield 610 in a setting direction- up and down or left and right). Hereinafter, explains an
10 example when the driver 620 is connected to front of the shield 610 and moves the shield 610 up and down.

[0076] A sealing 630 is provided in the back side of the shield 610. The sealing 630 may be provided to surround outer circumference of a gate G when the shield 610 is lined up on the gate G to close the gate (G1, G2, or G3; hereinafter refers to G), and
15 may enhance sealing of the gate G by the door 600.

[0077] FIG. 9 is a perspective view of a disassembled door.

[0078] Referring to FIG. 9, a distribution space 610 and a discharge hole 616 is formed in the shield 610.

[0079] The distribution space 615 is formed to have setting volume inner side of
20 the shield 610. In an example, the distribution space 615 may have a space of groove form on top side of a bottom plate 612 and the top of the bottom plate 612 may be closed by a top plate 611. In the shield 610, the discharge hole 616 connecting the distribution space 615 with an outer side is formed. The discharge hole 616 is formed in a direction toward the gate G when the shield 610 is moved to open the gate G.
25 Therefore, when the shield 610 is provided to move upward to open the gate G, the

discharge hole 616 is formed at the bottom surface of the shield 610. A plurality of discharge holes 616 may be formed outer surface of the shield 610 along the width of the gate G to correspond to the width of the gate G.

[0080] FIG. 10 shows movement of a door when a gate is opened.

5 **[0081]** A gas is flowed to the distribution space 615 through a pipe 631. In an example, the pipe 631 may be formed crossing the driver 620 and the shield 610. And an end of the pipe 631 may be connected to a gas supply device P. In an example, the gas supply device P may be a pipe. The gas supply device P supplies inert gas. The inert gas may be nitrogen. Also, the pipe 631 may be formed to connect
10 outer side of the shield 610 and the distribution space 615 and the gas supply device may be connected to outer side of the shield 610.

[0082] The discharge hole 616 discharges a gas toward the gate G which is opened. In an example, the gas supply device P may supply a gas for a gas to be discharged from the discharge hole 616 to the gate G when the gate G is opened as the shield
15 610 moved. Also, the gas supply device P may supply a gas irrespective to opening status of the gate G so that a gas discharged from the discharge hole 616 shields the front of the gate G, when the shield 610 is placed on a place where the gate G opens. Also, the gas supply device P may supply a gas for a gas to be discharged selectively to the opened gate G.

20 **[0083]** When the front of the gate G is shielded by a gas, the gate G may stop gas movement of minimize gas movement allowing the substrate movement.

[0084] FIG. 11 is a side view of a door movement in accordance with another embodiment of the present invention.

[0085] Referring to FIG. 11, the two gates G may be arranged up and down,
25 respectively. And a door 601, 602 to open and close the gate G may be provided in

each gate G, respectively. In here, a first door 601 placed in upper side may be moved to a top side when the gate G is opened. A second door 602 placed in bottom side may be moved to a bottom side when the gate G is opened. A first discharge hole 641 of the first door 601 may discharge a gas toward the gate G when the gate G placed on top is opened. And a second discharge hole 642 of the second door 602 may discharge a gas toward the gate G placed on top when the gate G placed on bottom is closed. Therefore, in the front of the top gate G, a gas discharged from the first door 610 and the second door 602 may be flowing. The first discharge hole 641 of the first door 601 and the second discharge hole 642 of the second door 602 which are formed in a corresponding direction may be formed in a position deviated from an array where the two doors are arranged vertically, when viewed from a lateral side. Therefore, a gas discharged from the first discharge hole 641 and the second discharge hole 642 may not collide and flow in front of the gate G.

[0086] The second door 602 may move to a direction to open the gate G placed at the bottom, and the first door 601 may operate similar to the above description when the gate G placed on top is closed.

[0087] Foregoing embodiments are examples of the present invention. Further, the above contents merely illustrate and describe preferred embodiments and embodiments may include various combinations, changes, and environments. That is, it will be appreciated by those skilled in the art that substitutions, modifications and changes may be made in these embodiments without departing from the principles and spirit, the scope of which is defined in the appended claims and their equivalents. Further, it is not intended that the scope of this application be limited to these specific embodiments or to their specific features or benefits. Rather, it is

intended that the scope of this application be limited solely to the claims which now follow and to their equivalents.

WHAT IS CLAIMED IS:

1. A substrate treating apparatus comprising:
 - an equipment front end module for carrying in a substrate for a treatment and carrying out the substrate which has been treated;
 - 5 a processing module for processing the substrate;
 - a transfer chamber for carrying in and out the substrate to the process module and controlling an oxygen concentration; and
 - a loadlock chamber positioned between the equipment front and end module and the transfer chamber for providing a path for the substrate to be moved and
 - 10 controlling an oxygen concentration;
- wherein the loadlock chamber comprises:
 - a carry in chamber for providing a path for the substrate carried in from the equipment front and end module to the transfer chamber; and
 - a carry out chamber for providing a path for the substrate carried out
 - 15 from the transfer chamber to the equipment front and end module;
- wherein the carry in chamber and the carry out chamber are arranged separately from each other;
- wherein the carry in chamber is provided with a carry in sensor for detecting an oxygen concentration within the carry in chamber;
- 20 wherein the carry out chamber is provided with a carry out sensor for detecting an oxygen concentration within the carry out chamber;
- wherein the transfer chamber is provided with a sensor for detecting an oxygen concentration within the transfer chamber; and
- wherein an oxygen concentration of the carry in chamber and the carry out
- 25 chamber is controlled independently.

2. The substrate treating apparatus of claim 1, wherein the carry in chamber is connected to a carry in supply line for supplying an inert gas and a carry in exhaust line for exhausting a gas.

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3. The substrate treating apparatus of claim 2, wherein a supply of the inert gas or an exhaust of the gas is controlled depending on an oxygen concentration detected from the carry in sensor.

10 4. The substrate treating apparatus of claim 1, wherein the carry out chamber is connected to a carry out supply line for supplying an inert gas and a carry out exhaust line for exhausting a gas.

15 5. The substrate treating apparatus of claim 4, wherein a supply of the inert gas or an exhaust of the gas is controlled depending on an oxygen concentration detected from the carry out sensor.

20 6. The substrate treating apparatus of claim 1, wherein the transfer chamber is connected to a supply line for supplying an inert gas and an exhaust line for exhausting a gas, wherein a supply of the inert gas or an exhaust of the gas is controlled depending on an oxygen concentration detected from the sensor.

25 7. The substrate treating apparatus of claim 1 further comprising a door for opening and closing a path where the substrate is transferred between the equipment front and end module and the loadlock chamber, or between the loadlock

chamber and the transfer chamber, or between the transfer chamber and the processing module

8. The substrate treating apparatus of claim 7, wherein the door
5 comprises:

a shield in which a discharge hole is formed to discharge an inert gas toward the outer surface of the path when the path is opened and provided as a plate form; and

a driver for moving the shield.
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9. The substrate treating apparatus of claim 8, wherein a plurality of the discharge holes is formed to the widthwise direction of the path corresponding to the width of the path.

10. The substrate treating apparatus of claim 9, wherein the shield
15 comprises a distribution space connected to the plurality of the discharge holes therein.

11. The substrate treating apparatus of claim 8, wherein the path is
20 arranged vertically, respectively, and wherein the door comprises a first door for opening and closing a top path and a second door for opening and closing a bottom path.

12. The substrate treating apparatus of claim 11, wherein the first door moves to a top when the top path is opened and the second door moves to a bottom when the bottom path is opened.

- 5 13. The substrate treating apparatus of claim 12, wherein a first discharge hole of the first door and a second discharge hole of the second door are formed in a position deviate from an array where the two doors are arranged vertically to each other when viewed from a lateral side.