

CLAIMS

1. A substrate processing system, comprising:
 - a process module configured to process a substrate, the
 - 5 process module including
 - a chamber, and
 - a substrate support configured to support an edge
 - ring including a first ring and a second ring placed on
 - the first ring, the substrate support being configured
 - 10 to support the substrate placed in an area on the
 - substrate support surrounded by the edge ring, the
 - substrate support including at least one lifter
 - configured to lift the first ring and the second ring
 - together;
 - 15 a transfer robot configured to transfer the edge ring;
 - a replacing module configured to replace at least one
 - of the first ring or the second ring included in the edge
 - ring with a replacement part to prepare a replacement edge
 - ring; and
 - 20 a controller configured to control the at least one
 - lifter and the transfer robot,
 - wherein the controller controls the at least one lifter
 - to lift the edge ring from the substrate support, and controls
 - the transfer robot to transfer the edge ring lifted by the at
 - 25 least one lifter between the process module and the replacing
 - module and to transfer the replacement edge ring prepared in

the replacing module between the replacing module and the process module,

wherein the replacing module includes an additional lifter configured to lift the second ring above the first ring.

2. The substrate processing system according to claim 1, further comprising:

a transfer module connected between the process module and the replacing module, the transfer module being configured to transfer the edge ring with the transfer robot through a chamber that is decompressed.

3. The substrate processing system according to claim 2, further comprising:

a loadlock module connected to the transfer module;

a loader module configured to transfer the edge ring through a housing having an atmospheric pressure; and

a load port connected to the loader module,

the controller controls the lifter included in the replacing module to lift the second ring included in the edge ring transferred into the replacing module above the first ring included in the edge ring,

controls the transfer robot to transfer the second ring lifted by the lifter included in the replacing module into the loadlock module,

controls the loader module to transfer the second ring transferred into the loadlock module to the load port, and

controls the transfer robot to transfer the replacement edge ring prepared by the second ring being replaced with a replacement part in the replacing module between the replacing module and the process module.

4. The substrate processing system according to claim 2, wherein the replacing module includes

a first storage area configured to store the second ring included in the edge ring transferred from the process module, and

a second storage area configured to store a replacement part to replace the second ring, and

the controller controls the lifter included in the replacing module to lift the second ring included in the edge ring transferred into the transfer module above the first ring included in the edge ring, and

controls the transfer robot to store the second ring lifted by the lifter included in the replacing module into the first storage area and to transfer the replacement edge ring including the first ring included in the edge ring transferred into the replacing module and the replacement part retrieved from the second storage area between the replacing module and the process module.

5. The substrate processing system according to claim 1, wherein the replacing module is directly connected to the process module.

5 6. The substrate processing system according to claim 5, wherein the replacing module includes

a first storage area configured to store the second ring included in the edge ring transferred from the process module, and

10 a second storage area configured to store a replacement part to replace the second ring, and

the controller controls the lifter included in the replacing module to lift the second ring included in the edge ring transferred into the transfer module above the first ring included in the edge ring, and

15 controls the transfer robot to store the second ring lifted by the lifter included in the replacing module into the first storage area and to transfer the replacement edge ring including the first ring included in the edge ring transferred into the replacing module and the replacement part retrieved from the second storage area between the replacing module and the process module.

25 7. The substrate processing system according to claim 4 or claim 6, wherein the replacing module further includes

a third storage area configured to store the first ring

included in the edge ring transferred from the process module,
and

a fourth storage area configured to store a replacement
part to replace the first ring, and

5 the controller controls the lifter included in the
replacing module to lift the second ring included in the edge
ring transferred into the transfer module above the first ring
included in the edge ring, and

controls the transfer robot to store the second ring
10 lifted by the lifter included in the replacing module into
the first storage area, to store the first ring included in
the edge ring transferred into the replacing module into the
third storage area, and to transfer the replacement edge ring
including the replacement part retrieved from the fourth
15 storage area and one of the second ring stored in the first
storage area or the replacement part retrieved from the second
storage area between the replacing module and the process
module.

20 8. The substrate processing system according to claim 2,
further comprising:

a loader module configured to transfer the edge ring
through a housing having an atmospheric pressure; and

a load port connected to the loader module,

25 wherein the replacing module is a loadlock module
connected to the transfer module,

the load port includes
a first storage area configured to store the second ring
included in the edge ring transferred from the process module,
and
5 a second storage area configured to store a replacement
part to replace the second ring, and
the controller controls the lifter included in the
replacing module to lift the second ring included in the edge
ring transferred into the replacing module above the first
10 ring included in the edge ring,
controls the loader module to store the second ring
lifted by the lifter included in the replacing module into
the first storage area and to transfer the replacement part
from the second storage area into the replacing module, and
15 controls the transfer robot to transfer the replacement
edge ring including the first ring included in the edge ring
transferred into the replacing module and the replacement part
transferred from the second storage area between the replacing
module and the process module.

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9. The substrate processing system according to claim 2,
further comprising:

a loadlock module connected to the transfer module; and
a loader module configured to transfer the edge ring
25 through a housing having an atmospheric pressure,
wherein the replacing module is connected to the loader

module and includes

a first storage area configured to store the second ring included in the edge ring transferred from the process module, and

5 a second storage area configured to store a replacement part to replace the second ring, and

the controller controls the lifter included in the replacing module to lift the second ring included in the edge ring transferred into the transfer module above the first ring

10 included in the edge ring,

controls the loader module to store the second ring lifted by the lifter included in the replacing module into the first storage area, and

controls the transfer robot to transfer the replacement

15 edge ring including the first ring included in the edge ring transferred into the replacing module and the replacement part retrieved from the second storage area between the replacing module and the process module.

20 10. A method for replacing an edge ring, comprising:

lifting an edge ring including a first ring and a second ring from a substrate support with at least one lifter in a chamber in a process module;

transferring the edge ring lifted by the at least one

25 lifter between the process module and a replacing module with a transfer robot;

replacing at least one of the first ring or the second ring included in the edge ring with a replacement part to prepare a replacement edge ring in the replacing module; and

transferring the replacement edge ring between the
5 replacing module and the process module with the transfer robot,

wherein the replacing module includes an additional lifter configured to lift the second ring above the first ring.

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