

thickens throughout the treatment of the substrates 10 and can reach a thickness of several micrometres. Made up of a mixture of SiO, Si and SiO₂, it is under considerable stress and delaminates in the form of shavings when it becomes too thick.

5 During the loading and unloading phases of the furnace 1, the loading column 3 enters and exits the chamber 2 and the substrates 10 then pass directly into the bottom of the chamber 2 where the SiO deposit 7 is present (figure 1c). The delamination of the latter induces specific contamination of
10 the substrates 10, which is particularly detrimental to the final quality thereof.

Quartz protective screens can be placed against the bottom of the chamber 2, so as to collect most of the SiO
15 deposit 7, thus ensuring the integrity of the chamber 2 of the furnace 1. These screens are sacrificial: they can be changed and make it possible to extend considerably the useful life of the chambers 2, which are extremely expensive parts of a thermal treatment system that take long to change.

20 Nevertheless, unless they are changed very regularly, which is not economically feasible, these protective screens are not a solution to the problem of specific contamination of the substrates 10 by the delamination of SiO deposits, since the loading column 3 of the substrates 10 continues to pass
25 near contaminated screens during the loading and unloading steps.

SUBJECT OF THE INVENTION

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Embodiments of the present invention seek to solve all or part of the aforementioned drawbacks. One embodiment of the invention is a thermal treatment system provided with a collector device which makes it possible to reduce or

eliminate the presence of deposits in the chamber of said system, in substrate transit areas, in order to avoid specific contamination which is detrimental to the quality of said substrates.

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BRIEF DESCRIPTION OF THE INVENTION

An aspect of the present invention provides a thermal
10 treatment system, comprising: a chamber capable of receiving a plurality of substrates supported by a loading column, the chamber having:

a proximal portion located near an area for entry of the plurality of substrates into the chamber, the proximal
15 portion having an opening in a bottom portion thereof configured to receive the loading column with the substrates;

a distal portion corresponding to an end of the chamber, located opposite the area for entry of the plurality of substrates into the chamber;

20 a central area in which the plurality of substrates is kept on the loading column, the central area extending between the proximal portion and the distal portion;

a gas intake path in the distal portion of the chamber;

an outlet path for gas and/or volatile species
25 generated during operation of the thermal treatment system, the outlet path located in the proximal portion of the chamber; and

a collector device in the proximal portion of the chamber, wherein:

30 the collector device has a confinement opening oriented toward the distal portion of the chamber;

the collector device defines a compartment between first and second convex walls of the collector device that communicates with the outlet path;

the compartment is configured so that the gas and/or the volatile species enter into the compartment via the confinement opening in a vertical direction, and exit the compartment in a horizontal direction to reach the outlet path; and

the collector device comprises a tip in communication with the compartment that is insertable into the outlet path.

There is also disclosed a thermal treatment system comprising a chamber capable of receiving a plurality of substrates, a gas intake path in a distal portion of the chamber located opposite an area where the substrates enter into the chamber, and an outlet path for the gas and/or volatile species generated during the thermal treatment, in a proximal portion of the chamber located near said area where the substrates enter into the chamber; the thermal treatment system is characterised in that it comprises, in the proximal portion of the chamber, a collector device:

- having a confinement opening oriented towards the distal portion of the chamber,
- defining a compartment communicating with the outlet path, the compartment being configured so that the gas and the volatile species enter into the compartment via the confinement opening and pass through the compartment to reach the outlet path, in order to promote the deposit of the volatile species on inner surfaces of the collector device.

The gas and the volatile species circulating in the chamber are collected in the compartment of the collector device, in the proximal portion of the chamber where the volatile species are likely to condense and to form a deposit. The deposit, if any must form, occurs at least partially on

the inner surfaces of the compartment of the collector device.
If delamination occurs, the particles are essentially

Claims

1. A thermal treatment system, comprising: a chamber capable of receiving a plurality of substrates supported by a loading column, the chamber having:
 - a proximal portion located near an area for entry of the plurality of substrates into the chamber, the proximal portion having an opening in a bottom portion thereof configured to receive the loading column with the substrates;
 - a distal portion corresponding to an end of the chamber, located opposite the area for entry of the plurality of substrates into the chamber;
 - a central area in which the plurality of substrates is kept on the loading column, the central area extending between the proximal portion and the distal portion;
 - a gas intake path in the distal portion of the chamber;
 - an outlet path for gas and/or volatile species generated during operation of the thermal treatment system, the outlet path located in the proximal portion of the chamber; and
 - a collector device in the proximal portion of the chamber, wherein:
 - the collector device has a confinement opening oriented toward the distal portion of the chamber;
 - the collector device defines a compartment between first and second convex walls of the collector device that communicates with the outlet path;
 - the compartment is configured so that the gas and/or the volatile species enter into the compartment via the confinement opening in a vertical direction, and exit the compartment in a horizontal direction to reach the outlet path; and
 - the collector device comprises a tip in communication with the compartment that is insertable into the outlet path.
2. The thermal treatment system of claim 1, wherein the collector device has the general shape of a hollow cylinder portion with an annular section, the annular section forming an annular section of the compartment.
3. The thermal treatment system of claim 1, wherein the collector device has the general shape of a hollow cylinder with an annular section, the annular section forming a section of the compartment.
4. The thermal treatment system of claim 3, wherein the annular section of the compartment has a width in a range extending from 1 mm to 10 mm.

5. The thermal treatment system of claim 2, wherein the annular section of the compartment has a width in a range extending from 1 mm to 10 mm.
6. The thermal treatment system of claim 5, wherein the confinement opening is located at a position in the chamber where the temperature is higher than a critical condensation temperature of volatile species during operation of the thermal treatment system.
7. The thermal treatment system of claim 6, wherein the collector device comprises:
 - a first cylindrical wall arranged adjacent an inner wall of the chamber; and
 - a second cylindrical wall having at least one purge hole.
8. The thermal treatment system of claim 7, wherein the collector device is removable.
9. The thermal treatment system of claim 8, wherein the collector device is formed from a material selected from the group consisting of quartz, silicon carbide, silicon, aluminum nitride, and alumina.
10. The thermal treatment system of claim 1, wherein the confinement opening is located at a position in the chamber where the temperature is higher than a critical condensation temperature of volatile species during operation of the thermal treatment system.
11. The thermal treatment system of claim 1, wherein the chamber is a vertical chamber, and wherein the confinement opening is located at a height that is lower than a substrate closest to the area for entry of the plurality of substrates into the chamber during operation of the thermal treatment system.
12. The thermal treatment system of claim 1, wherein the collector device comprises:
 - a first cylindrical wall arranged adjacent an inner wall of the chamber; and
 - a second cylindrical wall having at least one purge hole.
13. The thermal treatment system of claim 1, wherein the collector device is removable.
14. The thermal treatment system of claim 1, wherein the collector device is formed from a material selected from the group consisting of quartz, silicon carbide, silicon, aluminum nitride, and alumina.