SUMMARY

[0001] This summary may introduce a selection of concepts in a simplified form, which may be described in further detail below. This summary is not intended to necessarily identify key features or essential features of the claimed subject matter, nor is it intended to be used to limit the scope of the claimed subject matter.

[0002] In one aspect, a vapor deposition assembly for depositing material on a substrate is disclosed. The vapor deposition assembly comprises a deposition chamber comprising at least two deposition stations for depositing a material on a substrate, a plurality of susceptors each configured and arranged to hold a substrate, a susceptor moving arrangement configured and arranged to detachably hold a susceptor and to move said susceptor between deposition stations, a treatment chamber constructed and arranged to receive and treat a susceptor from the deposition chamber, and a transfer system configured and arranged to move the susceptors between the deposition chamber and the treatment chamber, the treatment chamber comprises an injector configured to provide a treatment gas or a plasma to a treatment chamber, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure, and wherein the treatment chamber is closed by bringing the injector and the susceptor together.

[0003] In some examples, the deposition assembly comprises a second transfer system configured and arranged to move a susceptor inside the treatment chamber.

[0004] In some examples, the susceptor moving arrangement is configured and arranged to move all the susceptors simultaneously.

[0005] In some examples, the susceptor moving arrangement rotates the susceptors in a circular manner about a rotational axis in between the susceptors.

[0006] In some examples, the assembly further comprises a susceptor staging station for holding one or more treated susceptors.

[0007] In some examples, the susceptor staging station is positioned in the deposition chamber.

[0008] In some examples, the assembly comprises more susceptors than deposition stations.

[0009] In some examples, the treatment chamber is a cleaning chamber.

[0010] In some examples, the cleaning chamber is a plasma cleaning chamber, a thermal cleaning chamber, an etch cleaning chamber, a chemical cleaning chamber, radiation cleaning chamber, an annealing chamber, a sputter cleaning chamber or a combination thereof.

[0011] In some examples, the treatment chamber is configured and arranged to treat a susceptor.

[0012] In some examples, the treatment chamber is configured and arranged to treat a substrate and a susceptor.

[0013] In some examples, the treatment chamber is configured and arranged to condition a susceptor.

[0014] In some examples, the conditioning comprises coating a susceptor.

[0015] In some examples the conditioning comprises annealing a susceptor.

[0016] In some examples, the deposition assembly comprises a substrate-handling system, and the substrate-handling system is configured and arranged to be used as the susceptor transfer system.

[0017] In some examples, the treatment chamber is configured and arranged to receive susceptors from at least two deposition chambers.

[0018] In another aspect, a treatment apparatus for treating susceptors of a vapor deposition assembly is disclosed. The apparatus comprises a housing, a susceptor holder configured and arranged to hold a susceptor to be treated, a treatment arrangement configured and arranged to treat a susceptor, wherein the treatment apparatus is configured and arranged to receive a susceptor from at least two deposition chambers, the treatment apparatus comprises an injector configured to provide a treatment gas or a plasma to a treatment chamber, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure, and wherein the treatment chamber is closed by bringing the injector and the susceptor together.

[0019] In some examples, the treatment apparatus comprises transfer system for moving susceptor between the susceptor holder and a deposition chamber.

[0020] In some examples, the treatment apparatus comprises a susceptor staging station for storing susceptors.

[0021] In yet another aspect, a method of cleaning a substrate is disclosed. The method comprises removing a susceptor from a susceptor moving arrangement in a vapor deposition chamber comprising at least two deposition stations, inserting the susceptor in a susceptor cleaning chamber connected to the vapor deposition chamber, closing the susceptor cleaning chamber by bringing an injector and the susceptor together, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure, and cleaning the susceptor.

[0022] In some examples, cleaning comprises providing a plasma in the susceptor cleaning chamber and/or heating the susceptor cleaning chamber.

[0023] In some examples, cleaning comprises providing an etchant in the susceptor cleaning chamber.

[0024] In some examples, cleaning comprises cleaning nitride material from the susceptor.

[0025] In this disclosure, any two numbers of a variable can constitute a workable range of the variable, and any ranges indicated may include or exclude the endpoints. Additionally, any values of variables indicated (regardless of whether they are indicated with “about” or not) may refer to precise values or approximate values and include equivalents, and may refer to average, median, representative, majority, or the like. Further, in this disclosure, the terms “including,” “constituted by” and “having” refer independently to “typically or broadly comprising,” “comprising,” “consisting essentially of,” or “consisting of” in some embodiments or examples. In this disclosure, any defined meanings do not necessarily exclude ordinary and customary meanings in some embodiments or examples.

BRIEF DESCRIPTION OF DRAWINGS

[0026] The accompanying drawings, which are included to provide a further understanding of the disclosure and constitute a part of this specification, illustrate exemplary embodiments, and together with the description help to explain the principles of the disclosure. In the drawings

CLAIMS

1. A vapor deposition assembly for depositing material on a substrate, the vapor deposition assembly comprising

   a deposition chamber comprising

      at least two deposition stations for depositing a material on a substrate;

      a plurality of susceptors each configured and arranged to hold a substrate;

      a susceptor moving arrangement configured and arranged to detachably hold a susceptor and to move said susceptor between deposition stations;

   a treatment chamber constructed and arranged to receive and treat a susceptor from the deposition chamber; and

   a transfer system configured and arranged to move the susceptor between the deposition chamber and the treatment chamber,

   wherein the treatment chamber comprises an injector configured to provide a treatment gas or a plasma to a treatment chamber, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure, and wherein the treatment chamber is closed by bringing the injector and the susceptor together.

2. The vapor deposition assembly of claim 1, wherein the vapor deposition assembly comprises a second transfer system configured and arranged to move a susceptor inside the treatment chamber.

3. The vapor deposition assembly of any of the preceding claims, wherein the susceptor moving arrangement is configured and arranged to move the plurality of susceptors simultaneously.

4. The vapor deposition assembly of claim 3, wherein the susceptor moving arrangement rotates the plurality of susceptors in a circular manner about a rotational axis.

5. The vapor deposition assembly of any of the preceding claims, wherein the vapor deposition assembly further comprises a susceptor staging station for holding a treated susceptor.

6. The vapor deposition assembly of claim 5, wherein the susceptor staging station is positioned in the deposition chamber.

7. The vapor deposition assembly of any of the preceding claims, wherein the assembly comprises more susceptors than deposition stations.

8. The vapor deposition assembly of any of the preceding claims, wherein the treatment chamber is a cleaning chamber.

9. The vapor deposition assembly of claim 8, wherein the cleaning chamber is a plasma cleaning chamber, a thermal cleaning chamber, an etch cleaning chamber, a chemical cleaning chamber, radiation cleaning chamber, an annealing chamber, a sputter cleaning chamber or a combination thereof.

10. The vapor deposition assembly of any of the preceding claims, wherein the treatment chamber is configured and arranged to treat a susceptor.

11. The vapor deposition assembly of any of the preceding claims, wherein the treatment chamber is configured and arranged to treat a substrate and a susceptor.

12. The vapor deposition assembly of any of the preceding claims, wherein the treatment chamber is configured and arranged to condition a susceptor.

13. The vapor deposition assembly of claim 12, wherein the conditioning comprises coating a susceptor.

14. The vapor deposition assembly of claim 12, wherein the conditioning comprises annealing a susceptor.

15. The vapor deposition assembly of any of the preceding claims, wherein the vapor deposition assembly comprises a substrate-handling system, and the substrate-handling system is configured and arranged to be used as the susceptor transfer system.

16. The vapor deposition assembly of any of the preceding claims, wherein the treatment chamber is configured and arranged to receive susceptors from at least two deposition chambers.

17. A treatment apparatus for treating a susceptor of a vapor deposition assembly comprising
    a housing;
    a susceptor holder configured and arranged to hold a susceptor to be treated;
    a treatment arrangement configured and arranged to treat a susceptor;
    wherein the treatment apparatus is configured and arranged to receive a susceptor from at least two deposition chambers,
    wherein the treatment apparatus comprises an injector configured to provide a treatment gas or a plasma to a treatment chamber, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure, and wherein the treatment chamber is closed by bringing the injector and the susceptor together.

18. The treatment apparatus of claim 17, wherein the treatment apparatus comprises transfer system for moving susceptor between the susceptor holder and a deposition chamber.

19. The treatment apparatus of claim 17 or 18, wherein the treatment apparatus comprises a susceptor staging station for storing susceptors.

20. A method of cleaning a substrate comprising
    removing a susceptor from a susceptor moving arrangement in a vapor deposition chamber comprising at least two deposition stations;

inserting the susceptor in a susceptor cleaning chamber connected to the vapor deposition chamber;

closing the susceptor cleaning chamber by bringing an injector and the susceptor together, wherein the injector serves as a lid of the treatment chamber and the susceptor forms a part of a treatment chamber enclosure; and

cleaning the susceptor.

21. The method of claim 20, wherein the cleaning comprises providing a plasma in the susceptor cleaning chamber and/or heating the susceptor cleaning chamber.

22. The method of any of claim 20 or 21, wherein the cleaning comprises providing an etchant in the susceptor cleaning chamber.

23. The method of any of claims 20 to 22, wherein the cleaning comprises cleaning nitride material from the susceptor.