

CLAIMS:

1. A substrate processing system comprising:
a factory interface;
a load lock coupled with the factory interface;
5 a transfer chamber coupled with the load lock, wherein the transfer chamber comprises a robot configured to retrieve substrates from the load lock; and
a chamber system positioned adjacent and coupled with the transfer chamber, the chamber system comprising:
a transfer region laterally accessible to the robot, wherein the transfer
10 region comprises:
a plurality of substrate supports disposed about the transfer region,
each substrate support of the plurality of substrate supports vertically translatable along a central axis of the substrate support between a first position and a second position,
15 a transfer apparatus rotatable about a central axis and configured to engage substrates and transfer substrates among the plurality of substrate supports, and
a plurality of processing regions vertically offset from the transfer region,
each processing region of the plurality of processing regions axially aligned with an
20 associated substrate support of the plurality of substrate supports, wherein each processing region is defined from below by an associated substrate support in the second position.
2. The substrate processing system of claim 1, wherein the plurality of substrate supports within the transfer region of the chamber system comprises at least four
25 substrate supports.
3. The substrate processing system of claim 1, wherein each processing region of the plurality of processing regions is fluidly coupled with the transfer region and fluidly isolated from above from each other processing region of the plurality of processing regions.

4. The substrate processing system of claim 1, further comprising at least two additional chamber systems positioned adjacent and coupled with the transfer chamber.

5. The substrate processing system of claim 4, wherein each chamber system defines two accesses along a surface of a housing of the transfer region adjacent the transfer chamber, wherein a first access of the two accesses is aligned with a first substrate support of the plurality of substrate supports, and wherein a second access of the two accesses is aligned with a second substrate support of the plurality of substrate supports.

6. The substrate processing system of claim 5, wherein the robot comprises two arms configured to deliver or retrieve a first substrate from the first substrate support through the first access and simultaneously deliver or retrieve a second substrate from the second substrate support through the second access.

7. The substrate processing system of claim 1, further comprising at least three additional chamber systems positioned adjacent and coupled with the transfer chamber.

8. The substrate processing system of claim 7, wherein each chamber system defines one access along a surface of a housing of the transfer region adjacent the transfer chamber, wherein the one access is aligned with a first substrate support of the plurality of substrate supports, wherein the robot comprises one arm configured to deliver or retrieve a substrate from the first substrate support through the one access, and wherein the one arm of the robot extends through the one access of each chamber system at an angle other than perpendicular to the one access.

9. A method of processing a substrate within a substrate processing system, the method comprising:

delivering, with a transfer chamber robot, a substrate to a first substrate support within a transfer region of a chamber system;

engaging the substrate at the first substrate support with a transfer apparatus housed within the transfer region of the chamber system;

transferring, with the transfer apparatus, the substrate to a second substrate support within the transfer region of the chamber system;

raising the substrate with the second substrate support along a central axis of the second substrate support to a first processing region overlying the transfer region, wherein the second substrate support at least partially defines the first processing region from below; and processing the substrate within the first processing region.

5 10. The method of processing a substrate of claim 9, wherein engaging the substrate with the transfer apparatus comprises engaging at least three substrates with the transfer apparatus, and wherein transferring the substrate comprises transferring the at least three substrates with the transfer apparatus to at least three other substrate supports within the transfer region.

10 11. The method of processing a substrate of claim 10, further comprising:
lowering the substrate with the second substrate support to a position within the transfer region accessible by the transfer apparatus;
engaging the substrate at the second substrate support with the transfer apparatus;
transferring, with the transfer apparatus, the substrate to a third substrate support
15 within the transfer region of the chamber system;

raising the substrate with the third substrate support along a central axis of the second substrate support to a second processing region overlying the transfer region, wherein the third substrate support at least partially defines the second processing region from below; and depositing an additional one or more layers of material on the substrate.

20 12. The method of processing a substrate of claim 9, wherein the transfer apparatus is rotatable about a central axis and configured to engage substrates and transfer substrates among a plurality of substrate supports within the transfer region.

 13. The method of processing a substrate of claim 9, wherein the chamber system includes a plurality of substrate supports disposed about the transfer region of the
25 chamber system, each substrate support of the plurality of substrate supports being vertically translatable along a central axis of the substrate support between a first position and a second position, wherein the chamber system includes a plurality of processing regions vertically offset from the transfer region of the chamber system, each processing region of the plurality of processing regions axially aligned with an associated substrate support of the plurality of

substrate supports, and wherein a processing region is defined from below by an associated substrate support in the second position.

14. The method of processing a substrate of claim 9, wherein the transfer chamber robot is housed in a transfer chamber adjacent to the chamber system.

5 15. A chamber system comprising:

a transfer region, wherein a housing of the transfer region defines at least one access for delivery or retrieval of a substrate, wherein the transfer region comprises:

a plurality of substrate supports disposed about the transfer region, each substrate support of the plurality of substrate supports vertically translatable along a central axis of the substrate support between a first position and a second position,

10 a transfer apparatus rotatable about a central axis and configured to engage substrates and transfer substrates among the plurality of substrate supports, and

a plurality of processing regions vertically offset from the transfer region, each processing region of the plurality of processing regions axially aligned with an associated substrate support of the plurality of substrate supports, wherein a processing region is defined from below by an associated substrate support in the second position.