

CLAIMS

What is claimed is:

1. A multi-station plasma processing system, comprising:
a first processing station comprising a first set of support features configured to support a
5 substrate at a first set of positions on a backside of the substrate when the substrate is processed
at the first processing station; and
a second processing station comprising a second set of support features configured to
hold the substrate at a second set of positions on the backside of the substrate when the substrate
is processed at the second processing station,
10 wherein the first set of positions are non-overlapping with the second set of
positions.
2. The multi-station plasma processing system of claim 1, wherein the first
processing station further comprises a first shower-pedestal and wherein the second processing
station further comprises a second shower-pedestal.
- 15 3. The multi-station plasma processing system of claim 2, wherein the first set of
support features comprises first spacers configured to support the substrate in a first spaced apart
relationship from the first shower-pedestal and wherein the second set of support features
comprises second spacers configured to support the substrate in a second spaced apart
relationship from the second shower-pedestal.
- 20 4. The multi-station plasma processing system of claim 2, wherein the first
processing station further comprises a first gas manifold coupled to the first shower-pedestal and
to provide a first gas from a first gas source when the substrate is processed at the first
processing station and wherein the second processing station further comprises a second gas
manifold coupled to the second shower-pedestal and to provide a second gas from a second gas
25 source when the substrate is processed at the second processing station.
5. The multi-station plasma processing system of claim 2, further comprising at least
one radio-frequency (RF) power supply configured to provide power to the first shower-pedestal
to generate a plasma for depositing a first film on the backside while the substrate is supported
by the first set of support features, wherein the at least one RF power supply is configured to
30 provide power to the second shower-pedestal to generate an additional plasma for depositing a
second film on the backside of the substrate while the substrate is supported by the second set of

support features.

6. The multi-station plasma processing system of claim 5, wherein the first set of positions are non-overlapping with the second set of positions such that all of the backside of the substrate has deposited thereupon at least one of the first and second films.

5 7. The multi-station plasma processing system of any one of claims 1-6, wherein the first set of support features and the second set of support features each comprise at least three support features sufficiently spaced apart to support the substrate in a stable manner.

8. The multi-station plasma processing system of any one of claims 1-6, further comprising:

10 at least one rotational indexer, the rotational indexer being configured transfer the substrate from the first processing station to the second processing station.

9. The multi-station plasma processing system of any one of claims 1-6, further comprising:

15 at least one rotational indexer, the rotation indexer being configured to lift a carrier ring such that the carrier ring engages with and lifts the substrate off of the first set of support features, transfer the carrier ring and the substrate from the first processing station to the second processing station, and lower the carrier ring such that the substrate rests on the second set of support features and the carrier ring disengages from the substrate.

20 10. A multi-station plasma processing system for processing a substrate having a nominal diameter of D, comprising:

a first processing station having a first set of support features;

a second processing station having a second set of support features; and

an indexer configured to rotate about a center axis and to thereby transfer the substrate from the first processing station to the second processing station, wherein:

25 the first set of support features has a first set of contact surfaces positioned within a first circular region having a first diameter of D and centered on a first center point of the first processing station,

the second set of support features has a second set of contact surfaces positioned within a second circular region having a second diameter of D and centered on a second center point of the second processing station, and

30 a rotational transform of the first center point and the first set of contact surfaces

about the center axis such that the rotationally transformed first center point aligns with the second center point results in no overlap between the second set of contact surfaces and the rotationally transformed first set of contact surfaces when viewed along the center axis.

11. The multi-station plasma processing system of claim 10, wherein the first
5 processing station further comprises a first shower-pedestal and wherein the second processing station further comprises a second shower-pedestal.

12. The multi-station plasma processing system of claim 11, wherein the first set of support features comprises first spacers configured to support the substrate in a first spaced apart relationship from the first shower-pedestal and wherein the second set of support features
10 comprises second spacers configured to support the substrate in a second spaced apart relationship from the second shower-pedestal.

13. The multi-station plasma processing system of any one of claims 10-12, wherein the first set of support features and the second set of support features each comprise at least three support features sufficiently spaced apart to support the substrate in a stable manner.

14. The multi-station plasma processing system of any one of claims 10-12, wherein
15 the first processing station comprises first equipment for depositing a first film on a backside of the substrate and wherein the second processing station comprises second equipment for depositing a second film on the backside of the substrate.

15. The multi-station plasma processing system of claim 14, wherein the first set of
20 contact surfaces are configured to contact the backside of the substrate at a first set of backside positions, wherein the second set of contact surfaces are configured to contact the backside of the substrate at a second set of backside positions, wherein the first set of support features block deposition of the first film at the first set of backside positions, and wherein the second set of support features permit deposition of the second film at the first set of backside positions.

16. The multi-station plasma processing system of claim 15, wherein the first set of
25 support features permit deposition of the first film at the second set of backside positions, and wherein the second set of support features block deposition of the second film at the second set of backside positions.

17. A method for processing a backside of a substrate in a multi-station plasma
30 processing system, the multi-station plasma processing system including a first station with a first set of support features and the multi-station plasma processing system including a second

station with a second set of support features, the method comprising:

moving a substrate onto the first set of support features;

processing the backside of the substrate while the substrate is on the first set of support features, wherein the first set of support features block processing of the backside of the substrate
5 at a first set of locations on the backside of the substrate;

moving the substrate onto the second set of support features; and

processing the backside of the substrate while the substrate is on the second set of support features, wherein the second set of support features do not block processing of the backside of the substrate at the first set of locations on the backside of the substrate.

10 18. The method of claim 17, wherein the first set of locations are non-overlapping with the second set of locations.

19. The method of any one of claims 17 or 18, wherein the second set of support features block processing of the backside of the substrate at a second set of locations on the backside of the substrate.

15 20. The method of claim 19, wherein the first set of support features do not block processing of the backside of the substrate at the second set of locations on the backside of the substrate.

21. The method of any one of claims 17 or 18, wherein the multi-station plasma processing system further includes an indexer and wherein moving the substrate onto the second
20 set of support features comprises rotating the indexer about a central axis to move the substrate from the first station to the second station.