CLAIMS

1. A system for processing a substrate, comprising:

a processing chamber including a pedestal to support a substrate; and

a controller configured to:

a) supply precursor to the processing chamber;

b) purge the processing chamber;

c) perform radio frequency (RF) plasma activation;

d) purge the processing chamber; and

e) prior to purging the processing chamber in at least one of (b) or (d), set a vacuum pressure of the processing chamber to a first predetermined pressure that is less than a vacuum pressure during the at least one of (a) or (c) for a first predetermined period.

2. The system of claim 1, wherein the first predetermined period is greater than or equal to 0.5 seconds and less than or equal to 5 seconds.

3. The system of claim 1, wherein the controller is configured to perform (e) before (b) and (d).

4. The system of claim 1, wherein the controller is configured to perform (e) before (d), and wherein the controller is configured to wait a predetermined period after (c) and before (e).

5. The system of claim 1, wherein the controller is configured to flow oxidants during (e).

6. The system of claim 5, wherein the oxidants comprise one of molecular oxygen and nitrous oxide.

7. The system of claim 1, wherein the RF plasma activation comprises RF plasma oxidation.

8. The system of claim 1, wherein the controller is configured to set vacuum pressure in the processing chamber greater than or equal to 1 Torr and less than or equal to 15 Torr during (a), (b), (c) and (d).

9. The system of claim 8, wherein the controller is configured to set vacuum pressure in the processing chamber during (a), (b), (c) and (d) to be approximately isobaric.

10. The system of claim 8, wherein the controller is configured to set vacuum pressure in the processing chamber during (e) greater than or equal to 5 mTorr and less than or equal to 2 Torr.

11. The system of claim 1, wherein the controller is configured to set vacuum pressure in the processing chamber greater than or equal to 3 Torr and less than or equal to 8 Torr during (a), (b), (c) and (d).

12. The system of claim 11, wherein the controller is configured to set vacuum pressure in the processing chamber during (a), (b), (c) and (d) to be approximately isobaric.

13. The system of claim 11, wherein the controller is configured to set vacuum pressure in the processing chamber during (e) greater than or equal to 5 mTorr and less than or equal to 500 mTorr.

14. The system of claim 1, wherein plasma-enhanced chemical vapor deposition is performed in the processing chamber.

15. The system of claim 1, wherein performing plasma-enhanced atomic layer deposition is performed in the processing chamber.