CLAIMS

What is claimed is:

1. A degas station for removing halogen species from a wafer that have accumulated during processing of the wafer, said degas station comprising:

a degas chamber capable of creating and maintaining a vacuum and capable of housing the wafer;

a wafer holder, for holding the wafer in the degas chamber;

~~a pressure sensor coupled with the degas chamber, for sensing the pressure in the degas chamber;~~

a UV light source, for treating the wafer with UV light while the wafer is in the degas chamber;

an injector, coupled with the degas chamber, for injecting a gas comprising at least one of oxygen, ~~H_2O,~~ or ozone into the degas chamber such that the gas flows over the wafer housed in the degas chamber;

an exhaust system, coupled with the degas chamber, wherein the exhaust system is capable of evacuating the degas chamber to create a vacuum and wherein the exhaust system is capable of removing the gas in a manner that substantially maintains the vacuum in the degas chamber while the gas is injected into the degas chamber;

a first wafer opening, in the degas chamber, for receiving the wafer from ~~the~~ a load-locked vacuum chamber; and

a plurality of vacuum seals, surrounding the first wafer opening such that the degas chamber is coupled with the vacuum chamber at the first wafer opening.

2. The degas load lock station recited in claim 1, wherein the UV light source is disposed outside of the degas chamber and wherein at least one side of the degas chamber is such that the UV light from the UV light source passes through a window into the degas chamber onto the wafer.

3. The degas load lock station recited in claim 1, wherein the UV light source is disposed inside the degas chamber.

4. The degas load lock station recited in claim 1, further comprising:

an isolation station, wherein the isolation station holds a plurality of wafers that have been degassed in the degas chamber.

5. The degas load lock station recited in claim 4, wherein the isolation station includes an exhaust that pumps air out of the isolation station.

6. The degas load lock station recited in claim 1, wherein the UV light source is less than 30 cm from the wafer holder.

7. The degas load lock station recited in claim 1, wherein the gas comprises ozone.

8. The degas load lock station recited in claim 1, wherein the gas comprises oxygen and the UV light provided by the UV light source is such that ozone is generated in the degas chamber by application of the UV light to the gas comprising oxygen.

~~9. The degas station recited in claim 1, further comprising a second wafer opening in the degas chamber for transferring the wafer to an ambient atmosphere environment.~~

~~10. The degas station recited in claim 9, further comprising an atmospheric vent capable of venting the degas chamber to atmospheric pressure to provide for wafer transfer to atmosphere.~~

~~11~~9. A method comprising:

providing a wafer into an entrance load lock chamber;

creating a vacuum in the entrance load lock chamber;

transporting the wafer from the entrance load lock chamber to a processing tool;

processing the wafer ~~in a process chamber in the processing tool~~ to provide a processed wafer, wherein the processing forms halogen residue on the wafer;

transferring the processed wafer into a degas chamber through a first opening in the degas chamber, wherein a vacuum is maintained in the degas chamber;

treating the processed wafer in the degas chamber with UV light and a flow of gas comprising at least one of ozone~~,~~ or oxygen~~, or H_2O~~;

stopping the flow of gas;

~~stopping the UV light;~~

venting the degas chamber to atmospheric pressure such that the vacuum is removed; and

removing the processed wafer from the degas chamber, through a second opening in the degas chamber.

~~12. The method, as recited in claim 11, further comprising providing a degas step to the wafer in the process chamber after processing the wafer and before transferring the processed wafer into the degas chamber.~~

~~13. The method, as recited in claim 12, wherein the providing a degas step to the wafer in the process chamber, comprises:~~

~~providing a halogen free gas of at least 5% oxygen; and~~

~~forming a plasma from the gas of at least 5% oxygen.~~

~~14. The method, as recited in claim 13, further comprising dechucking the wafer in the process chamber, wherein the providing a degas step is concurrent with the dechucking the wafer.~~

~~15. The method, as recited in claim 14, wherein the dechucking the wafer, comprises lifting the wafer in the process chamber in the presence of the plasma from the gas of at least 5% oxygen.~~

~~16. The method, as recited in claim 15, wherein the halogen free gas further comprises nitrogen, wherein a flow rate of the nitrogen is between 10% to 20% of a flow rate of the oxygen.~~

~~17. The method, as recited in claim 16, wherein the degas step removes carbon residues.~~

~~18. The method, as recited in claim 17, wherein the halogen free gas is at least 50% oxygen.~~

~~19. The method, as recited in claim 13, wherein the wafer is a silicon wafer and wherein the processing the wafer in a process chamber, comprises performing a fluorine containing wafer process.~~

~~20. The method, as recited in claim 19, further comprising forming silicon features in the wafer, wherein the silicon features have silicon oxide sidewall passivation, wherein the performing the fluorine containing process removes the silicon oxide sidewall passivation.~~

~~21. The method, as recited in claim 13, wherein the halogen free gas is at least 70% oxygen.~~

~~22. The method, as recited in claim 21, wherein the halogen free gas further comprises nitrogen, wherein a flow rate of the nitrogen is between 10% to 20% of a flow rate of the oxygen.~~

~~23. A method, as recited in claim 11, wherein the flow of gas comprising at least one of ozone, oxygen, or H_20 further comprises nitrogen.~~

~~24~~10. The method~~, as recited in~~ of claim ~~23~~ 9, further comprising:

transferring the processed wafer to an isolation station after removal from the degas chamber, wherein the isolation station holds a plurality of processed wafers.

11. The method of claim 9, further comprising pumping out the flow of gas comprising at least one of ozone or oxygen.

12. The method of claim 9, wherein the gas further comprises one or more of: nitrogen gas or water vapor.

13. The method of claim 10, wherein the providing a wafer to the entrance load lock chamber provides the wafer from a cassette, and further comprising transferring the processed wafer from the isolation station to the cassette.

~~25. The method, as recited in claim 24, further comprising transferring the processed wafer from the isolation station to a cassette.~~

~~26. The method, as recited in claim 11, further comprising venting the degas chamber before removing the processed wafer from the degas chamber, and wherein the removing the processed wafer from the degas chamber is through a second opening in the degas chamber.~~

~~27~~14. The method~~, as recited in~~ of claim ~~11~~ 13, wherein the processed wafer is treated in the degas chamber for between 5 seconds and 30 minutes.

15. The method of claim 9, wherein the flow of gas comprises ozone.

16. The method of claim 9, wherein the gas comprises oxygen and wherein the UV light provided by the UV light source is such that ozone is generated in the degas chamber by application of the UV light to the gas comprising oxygen.

~~28. The method, as recited in claim 11, wherein the silicon wafer comprises one or more layers over the wafer, wherein the performing an etch of the wafer, comprises etching one or more layers over the wafer.~~

~~29. The method, as recited in claim 28, wherein the one or more layers comprises at least one layer of polysilicon, SiO_2, SiN, W, TiN, TiA1N, WSi_x, TaN, Ti, TiO_2, $A1_2O_3$, or ZrO_2.~~

~~30~~17. A system for processing a wafer used to produce semiconductor devices, said system comprising:

an entrance load lock;

a degas station; said degas station comprising:

a degas chamber capable of creating and maintaining a vacuum and capable of housing the wafer;

a wafer holder, for holding the wafer in the degas chamber;

a UV light source, for treating the wafer with UV light while the wafer is in the degas chamber;

an injector, coupled with the degas chamber, for injecting a gas comprising at least one of oxygen~~, H_2O,~~ or ozone into the degas chamber such that the gas flows over the wafer housed in the degas chamber;

an exhaust system, coupled with the degas chamber, wherein the exhaust system is capable of evacuating the degas chamber to create a vacuum and wherein the exhaust system is capable of removing the gas in a manner that substantially maintains the vacuum in the degas chamber while the gas is injected into the degas chamber;

a first wafer opening, in the degas chamber; and

a plurality of vacuum seals surrounding the first wafer opening;

a processing tool comprising:

a vacuum transport module coupled with the entrance load lock and coupled with the degas chamber at the first wafer opening; and

a plurality of processing chambers, coupled with the vacuum transport module, for processing the wafer;

wherein the plurality of vacuum seals surround the first wafer opening such that the degas chamber is coupled with the vacuum transport module and the plurality of vacuum seals maintain a vacuum seal between the degas chamber and the vacuum transport module.

~~31~~18. The system recited in claim ~~30~~ 17, wherein the degas station further comprises:

an isolation station, wherein the isolation station holds a plurality of wafers that have been degassed in the degas chamber.

~~32~~19. The system recited in claim ~~30~~ 17, wherein the plurality of processing chambers comprises at least one processing chamber configured to perform at least one of: applying an etch mask, etching or stripping an etch mask.

20. The degas station, as recited in claim 1, further comprising:

a pressure sensor coupled with the degas chamber, for sensing pressure in the degas chamber;

an atmospheric vent capable of venting the degas chamber to atmospheric pressure to provide for wafer transfer to atmosphere; and

a second wafer opening in the degas chamber, for transferring the wafer out of the degas chamber to an ambient atmosphere environment, wherein the degas station acts as both a degas and load lock station in a single chamber.

~~33. The system recited in claim 30, wherein the degas station, further comprises:~~

~~a second wafer opening in the degas chamber for transferring the wafer to an ambient atmosphere environment; and~~

~~an atmospheric vent capable of venting the degas chamber to atmospheric pressure to provide for wafer transfer to atmosphere.~~

~~34. The system, recited in claim 30, wherein the plurality of processing chambers comprises at least one processing chamber configured to perform an etch and an *in-situ* degas.~~

~~35. The degas station recited in claim any of claims 1-2, further comprising:~~

~~an isolation station, wherein the isolation station holds a plurality of wafers that have been degassed in the degas chamber.~~

~~36. The degas station recited in claim 35, wherein the isolation station includes an exhaust that pumps air out of the isolation station.~~

~~37. The degas station recited in any of claims 1-2 and 35-36, wherein the UV light source is less than 30 cm from the wafer holder.~~

~~38. The degas station recited in any of claims 1-2 and 35-37, wherein the gas comprises ozone.~~

~~39. The degas station recited in any of claims 1-2 and 35-38, wherein the gas comprises oxygen and the UV light provided by the UV light source is such that ozone is generated in the degas chamber by application of the UV light to the gas comprising oxygen.~~

~~40. The degas station recited in any of claims 1-2 and 35-39, further comprising a second wafer opening in the degas chamber for transferring the wafer to an ambient atmosphere environment.~~

41. The degas station recited in any of claims 1-2 and 35-40, further comprising an atmospheric vent capable of venting the degas chamber to atmospheric pressure to provide for wafer transfer to atmosphere.

42. The method, as recited in any of claims 12-13, further comprising dechucking the wafer in the process chamber, wherein the providing a degas step is concurrent with the dechucking the wafer.

43. The method, as recited in claim 42, wherein the dechucking the wafer, comprises lifting the wafer in the process chamber in the presence of the plasma from the gas of at least 5% oxygen.

44. The method, as recited in any of claims 13 and 42-43, wherein the halogen free gas further comprises nitrogen, wherein a flow rate of the nitrogen is between 10% to 20% of a flow rate of the oxygen.

45. The method, as recited in any of claims 12-13 and 42-44, wherein the degas step removes carbon residues.

46. The method, as recited in any of claims 13 and 42-45, wherein the halogen free gas is at least 50% oxygen.

47. The method, as recited in any of claims 11-13 and 42-46, wherein the wafer is a silicon wafer and wherein the processing the wafer in a process chamber, comprises performing a fluorine containing wafer process.

48. The method, as recited in claim 47, further comprising forming silicon features in the wafer, wherein the silicon features have silicon oxide sidewall passivation, wherein the performing the fluorine containing process removes the silicon oxide sidewall passivation.

49. The method, as recited in any of claims 13 and 42-48, wherein the halogen free gas is at least 70% oxygen.

50. The method, as recited in any of claims 11-13 and 42-49, further comprising transferring the processed wafer to an isolation station after removal from the degas chamber, wherein the isolation station holds a plurality of processed wafers.

51. The method, as recited in claim 50, further comprising transferring the processed wafer from the isolation station to a cassette.

52. The method, as recited in any of claims 11-13 and 42-51, further comprising venting the degas chamber before removing the processed wafer from the degas

~~chamber, and wherein the removing the processed wafer from the degas chamber is through a second opening in the degas chamber.~~

~~53. The method, as recited in any of claims 11-13 and 42-52, wherein the process wafer is treated in the degas chamber for between 5 seconds and 30 minutes.~~

~~54. The method, as recited in any of claims 11-13 and 42-53, wherein the silicon wafer comprises one or more layers over the wafer, wherein the performing an etch of the wafer, comprises etching one or more layers over the wafer.~~

~~55. The method, as recited in claim 54, wherein the one or more layers comprises at least one layer of polysilicon, SiO_2, SiN, W, TiN, TiA1N, WSi_x, TaN, Ti, TiO_2, $A1_2O_3$, or ZrO_2.~~

~~56. The system recited in any of claims 30-31, wherein the plurality of processing chambers comprises at least one processing chamber configured to perform at least one of: applying an etch mask, etching or stripping an etch mask.~~

~~57. The system recited in any of claims 30-31 and 56, wherein the degas station, further comprises:~~

~~a second wafer opening in the degas chamber for transferring the wafer to an ambient atmosphere environment; and~~

~~an atmospheric vent capable of venting the degas chamber to atmospheric pressure to provide for wafer transfer to atmosphere.~~

~~58. The system, recited in any of claims 30-31 and 56-57, wherein the plurality of processing chambers comprises at least one processing chamber configured to perform an etch and an *in-situ* degas.~~