[0018] The transfer chamber 106 may have one or more environmental controls. For example, an airflow opening in the transfer chamber 106 may include a filter to filter the airflow entering the transfer chamber 106. Other environmental controls may include one or more of humidity control, static control, temperature control, or pressure control.

[0019] The one or more process chambers 105 may be coupled orthogonally to the transfer chamber 106 or may be coupled at an angle with respect to the transfer chamber 106. The plurality of process chambers 105 may be sealingly engaged with the transfer chamber 106. The transfer chamber 106 generally operates at atmospheric pressure but may be configured to operate at vacuum pressure. The plurality of process chambers 105 are configured to perform one or more processing steps to one or more substrates 112 being processed in the tool 100. For example, the plurality of process chambers 105 may comprise one or more wet clean chambers 130 (three shown in Figure 1) configured to clean the one or more substrates 112 with a liquid, for example, water. The plurality of process chambers 105 may comprise one or more dry clean chambers 140 (two shown in Figure 1) configured to perform a dry clean process on the one or more substrates 112, for example, via a plasma etch or plasma ashing procedure. The one or more process chambers 105 includes at least one baking chamber, for example, the baking chamber 150 configured to heat the one or more substrates to remove residue or haze left over after the wet clean or dry clean process. In some embodiments, the one or more wet clean chambers 130 are disposed on a side of the transfer chamber 106 different than the one or more dry clean chambers 140.

[0020] Figure 2 depicts a schematic cross-sectional side view of a baking chamber 150 in accordance with at least some embodiments of the present disclosure. The baking chamber 150 may be part of a multi chamber process tool such as tool 100, or a standalone chamber. The baking chamber 150 generally comprises a chamber body 202 enclosing a first interior volume 204 and a second interior volume 206, disposed beneath and fluidly independent from the first interior volume 204. In some embodiments, the first interior volume 204 is configured to operate at non-vacuum pressure, and the second interior volume 206 is configured to operate at vacuum pressure. In some embodiments, both the first interior volume 204 and the

second interior volume 206 are configured to operate at vacuum pressure. The chamber body 202 may be made of a metal, such as aluminum or stainless steel.

[0021] A radiant heat source 208 is disposed in the first interior volume 204. In some embodiments, the radiant heat source 208 comprises one or more infrared (IR) lamps arranged in a suitable pattern. In some embodiments, a surface temperature of the radiant heat source 208 may be about 1000 degrees Celsius or greater during use. In some embodiments, the radiant heat source 208 is configured to heat the second interior volume 206 to about 70 to about 150 degrees Celsius.

[0022] A window 210 is disposed between the first interior volume 204 and the second interior volume 206. The window 210 is made of a material that is transparent to thermal radiation such that radiant energy from the radiant heat source 208 can enter the second interior volume 206 through the window 210. The window 210 advantageously allows radiant energy to pass through the window 210 while preventing any particles shed from the high heat of the radiant heat source 208 from passing through the window 210. In some embodiments, the window 210 is made of a material having a transmission coefficient of 0.75 or greater. In some embodiments, the window 210 is made of potassium bromide, zinc selenide, zinc sulfide, or potassium chloride. In some embodiments, the window 210 is made of a solid material with no through holes. In some embodiments, the window 210 is coupled to sidewalls of the chamber body 202. In some embodiments, an upper surface of the window 210 has a direct line of sight to the radiant heat source 208.

[0023] In some embodiments, a top reflector 228 made of a suitable material is disposed in the first interior volume 204 and configured to direct thermal radiation to the window 210. In some embodiments, the top reflector 228 is disposed in the first interior volume 204 on a side of the radiant heat source 208 opposite the window 210. The top reflector 228 may have any suitable shape, such as one or more concave, convex, or angled surfaces.

[0024] A photomask support structure 232 configured to support a substrate 240 is disposed in the second interior volume 206. The substrate 240 may be one of the one or more substrates 112 of Figure 1. In use, radiation from the radiant heat source 208 enters through the window 210 and is configured to impinge upon the

Claims:

1. A baking chamber for baking a photomask, comprising:

a chamber body enclosing a first interior volume and a second interior volume, disposed beneath and fluidly independent from the first interior volume;

a radiant heat source disposed in the first interior volume;

a photomask support structure configured to support a photomask disposed in the second interior volume;

a window disposed between the first interior volume the second interior volume, wherein the window is made of a material that is transparent to thermal radiation such that radiant energy from the radiant heat source can enter the second interior volume through the window and impinge upon the photomask support structure;

a first gas inlet and a first gas outlet coupled to the first interior volume; and

a second gas inlet and a second gas outlet coupled to the second interior volume on opposite ends thereof to facilitate flow of a process gas laterally through the second interior volume and across the photomask support structure.

2. The baking chamber of claim 1, further comprising a mask edge ring disposed on the photomask support structure and configured to surround the photomask.

3. The baking chamber of claim 2, wherein the mask edge ring has a square central opening.

4. The baking chamber of claim 2, wherein an outer diameter of the radiant heat source is greater than an outer diameter of the mask edge ring.

5. The baking chamber of claim 1, wherein the radiant heat source comprises one or more infrared lamps.

6. The baking chamber of claim 1, wherein the radiant heat source comprises an infrared (IR) lamp disposed in the first interior volume.

7. The baking chamber of any of claims 1 to 6, wherein the first gas inlet and the first gas outlet are disposed on opposite sides of the chamber body and configured to flow a first process gas across the radiant heat source.

8. The baking chamber of any of claims 1 to 6, wherein the second gas outlet is fluidly coupled to a vacuum line.

9. The baking chamber of claim 8, wherein the first gas outlet is fluidly coupled to a first gas line, and wherein the first gas line is coupled to the vacuum line via a vacuum bypass line having a vacuum valve.

10. The baking chamber of any of claims 1 to 6, wherein the window is made of a material having a transmission coefficient of 0.75 or greater.

11. The baking chamber of any of claims 1 to 6, wherein the window is made of potassium bromide, zinc selenide, zinc sulfide, or potassium chloride.

12. The baking chamber of any of claims 1 to 6, wherein the radiant heat source is configured to heat a surface of the photomask to about 70 to about 150 degrees Celsius.

13. The baking chamber of any of claims 1 to 6, wherein the first gas inlet is coupled to a first gas source having an inert gas or air and the second gas inlet is coupled to a second gas source having an inert gas or air.

14. The baking chamber of any of claims 1 to 6, wherein the first interior volume is configured to operate at non-vacuum pressure, and the second interior volume is configured to operate at vacuum pressure.

15. The baking chamber of any of claims 1 to 6, further comprising a top reflector disposed in the first interior volume and configured to direct thermal radiation to the window.

16. A method of baking a photomask in a baking chamber, comprising:

placing a photomask on a support in a lower volume of the baking chamber;

pumping down the lower volume of the baking chamber to a vacuum pressure; and

heating the photomask via a radiant heat source disposed in an upper volume of the baking chamber separated from the lower volume via a window that is transparent to infrared radiation to dissociate photomask residue on the photomask.

17. The method of claim 16, further comprising flowing a first process gas across the upper volume from a first gas inlet of the baking chamber to a first gas outlet of the baking chamber to more uniformly heat the upper volume.

18. The method of claim 17, further comprising flowing a second process gas across the lower volume from a second gas inlet of the baking chamber to a second gas outlet of the baking chamber after heating the photomask.

19. The method of claim 18, wherein the first process gas and the second process gas comprise essentially an inert gas or air.

20. The method of any of claims 16 to 19, wherein heating the photomask comprises heating a surface of the photomask to a temperature of about 70 to about 150 degrees Celsius.