CLAIMS

1. A semiconductor waste abatement system for a semiconductor processing a waste gas outlet, the semiconductor processing system having a semiconductor processing chamber, said semiconductor waste abatement system comprising: a vacuum pump having a pump inlet and a pump outlet;

an abatement apparatus having an abatement chamber including a waste gas inlet and an outlet, said waste gas inlet adapted for fluid communication with a source of waste gas from the waste gas outlet of the semiconductor processing chamber, said abatement chamber including an outer tube having said waste gas inlet, said waste gas inlet of said outer tube being adapted for fluid communication with the waste gas outlet of the semiconductor processing chamber, said abatement chamber further having an inner tube spaced inwardly of said outer tube to define a space there between and inwardly of said waste gas inlet, said inner tube having an inner wall, an inlet, and an outlet, ,said outlet of said inner tube being adapted for fluid communication with said pump inlet of said vacuum pump wherein said abatement chamber is under a vacuum, and said abatement chamber being configured to ionize the waste gas and to exhaust ionized gas in said outer tube at said output of said abatement apparatus; a filter apparatus including a filter chamber, an inlet, and an outlet, said filter chamber forming a liquid reservoir, and said inlet of said filter apparatus in fluid communication with said outlet of said abatement chamber and said liquid reservoir, and said outlet of said filter apparatus in communication with said vacuum pump inlet, wherein the filter chamber is under a vacuum, and wherein the waste gas is ionized in said abatement chamber and then filtered by said filter apparatus prior to input to said vacuum pump; and a fluid feeding circuit flowing fluid to said space between said outer tube and said inner tube wherein the fluid flows to said inlet of said inner tube to wet the inner wall of the inner tube to remove particles that may be deposited on said inner wall when said semiconductor waste abatement apparatus is used to abate the waste gas from the semiconductor processing chamber.

2. The semiconductor waste abatement system according to claim 1, wherein said abatement apparatus is configured to ionize the waste gas into a plasma under vacuum.

3. The semiconductor waste abatement system according to claim 2, wherein said abatement apparatus is configured to generate an electromagnetic field to ionize the waste gas into the plasma.

4. The semiconductor waste abatement system according to claim 2, wherein said filter apparatus further including a feed tube, said feed tube having a venturi restriction therein and a venturi inlet to draw in the process gas or the filter liquid into said filter apparatus, wherein said filter apparatus operates under a vacuum.

5. The semiconductor waste abatement system according to claim 4, wherein said feed tube comprises a perforated feed tube.

6. The semiconductor waste abatement system according to claim 4, wherein said filter apparatus includes a filter liquid control system for controlling the filter liquid flow into and out of said liquid reservoir, and optionally said filter liquid control system configured to maintain the filter liquid at a liquid height in said liquid reservoir.

7. The semiconductor waste abatement system according to claim 6, wherein said filter liquid control system includes a pump to pump filter liquid into said liquid reservoir under a vacuum.

8. The semiconductor waste abatement system according to claim 4, wherein said filter chamber includes a rotating member to rotate the filter fluid in said filter chamber, wherein said filter chamber operates under a vacuum.

9. A semiconductor waste abatement apparatus for a semiconductor processing system, the semiconductor processing system having a semiconductor processing chamber and a vacuum pump, semiconductor processing chamber having a waste gas outlet, and said vacuum pump having an inlet, said semiconductor waste abatement apparatus comprising:

an abatement chamber including an outer tube having an inlet, said inlet of said outer tube being adapted for fluid communication with the waste gas outlet of the semiconductor processing chamber, said abatement chamber further having an inner tube spaced inwardly of said outer tube to define a space there between and inwardly of said waste gas inlet, said inner tube having an inner wall, an inlet, and an outlet, said outlet of said inner tube being adapted for fluid communication with said inlet of said vacuum pump wherein said abatement chamber is under a vacuum;

said abatement chamber configured to ionize the waste gas in said outer tube; and

a fluid feeding circuit flowing fluid to said space between said outer tube and said inner tube wherein the fluid flows to said inlet of said inner tube to wet the inner wall of the inner tube to remove particles that may be deposited on said inner wall when said semiconductor waste abatement apparatus is used to abate waste gas from the semiconductor processing chamber.

10. The semiconductor waste abatement apparatus of claim 9, wherein said fluid feeding circuit is configured to recirculate fluid from said outlet of said inner tube to said space between said outer tube and said inner tube.

11. The semiconductor waste abatement apparatus of claim 9, further comprising a coil adapted to generate an electromagnetic field to ionize the waste gas into a plasma.

12. The semiconductor waste abatement apparatus of claim 11, wherein said coil includes a plurality of loops, said inner tube spaced from a lowermost loop of said plurality of loops.

13. The semiconductor waste abatement apparatus of claim 9, wherein said inner tube comprises a first inner tube, further comprising a second inner tube in fluid communication with first inner tube, said

second inner tube having an inlet and forming or being adapted for fluid communication with said outlet of said semiconductor waste abatement apparatus.

14. The semiconductor waste abatement apparatus of claim 13, wherein said inlet of said second inner tube is spaced below said outlet of said first inner tube, and said fluid feeding circuit recirculates fluid from below said inlet of said second inner tube and flows the recirculated fluid into the space between the first inner tube and the outer tube below the inlet of the first inner tube under a vacuum.

15. The semiconductor waste abatement apparatus of claim 13, further comprising a base, said base having a fluid chamber, said outer tube extending into said base, and said first inner tube extending from said fluid chamber of said outer tube into said fluid chamber in said base.

16. The semiconductor waste abatement apparatus of claim 13, in combination with a fluid filter, said fluid filter having an input in fluid communication with said output of said semiconductor waste abatement apparatus and an output for fluid communication with the vacuum pump wherein said fluid filter is under a vacuum.

17. The semiconductor waste abatement apparatus of claim 16, wherein said fluid filter is configured to provide make up fluid to said fluid circulating circuit.

18. A method of abating a waste gas from a semiconductor process chamber, said method comprising the steps of:

ionizing the waste gas in an abatement chamber under a vacuum prior to flowing the ionized waste gas into a vacuum pump;

directing the ionized waste gas in to a fluid filter to thereby filter the ionized waste gas and particles contained therein; and

exhausting the filtered ionized waste gas to the vacuum pump.

19. The method according to claim 18, further comprising flowing fluid to an inner surface of the abatement chamber to thereby remove particles attached to the inner surface of the abatement chamber.

20. The method according to claim 19, wherein said step of flowing fluid to the abatement chamber to thereby remove particles attached to the inner surface of the abatement chamber includes recirculating fluid from one portion of the abatement chamber back to another portion of the abatement chamber.