

CLAIMS

1. A method for cleaning substrates, comprising:
placing a substrate on a substrate holder;
removing scums or burrs to improve the roughness in recessed areas of the substrate;
implementing a bubble less or bubble-free pre-wetting process for the substrate,
wherein the bubble less or bubble-free pre-wetting process comprises building a vacuum environment surrounding the substrate, and then supplying pre-wetting chemical solution or chemical mist onto the substrate, or evaporating pre-wetting chemical solution, and then guiding the chemical liquid vapor onto the surface of the substrate to form pre-wetting chemical liquid layer on the substrate; and
implementing an ultra/mega sonic cleaning process for cleaning the substrate.
- ~~2. The method as claimed in claim 1, wherein the bubble less or bubble free pre-wetting process comprises building a vacuum environment surrounding the substrate, and then supplying pre-wetting chemical solution or chemical mist onto the substrate.~~
- ~~32. The method as claimed in claim 21, wherein the vacuum degree is set at 25Torr and above.~~
- ~~4. The method as claimed in claim 1, wherein the bubble less or bubble free pre-wetting process comprises evaporating pre-wetting chemical solution, and then guiding the chemical liquid vapor onto the surface of the substrate to form pre-wetting chemical liquid layer on the substrate.~~
- ~~53. The method as claimed in claim 41, wherein the pre-wetting chemical solution is evaporated by a sonic generating method.~~

~~6~~4. The method as claimed in claim ~~5~~3, further comprising heating the chemical liquid vapor to a temperature higher than the temperature of the substrate.

~~7~~5. The method as claimed in claim ~~5~~3, further comprising cooling the substrate to a temperature lower than the temperature of the chemical liquid vapor.

~~8~~6. The method as claimed in claim ~~4~~1, wherein the pre-wetting chemical solution is evaporated by a thermal heating method.

~~9~~7. The method as claimed in claim ~~4~~1, wherein the pre-wetting chemical solution contains surfactant or additives.

~~10~~8. The method as claimed in claim ~~9~~7, wherein the surfactant is carboxyl-containing ethylenediamine tetraacetic acid or tetracarboxyl compound-ethylenediamine tetrapropionic acid/salt.

~~11~~9. The method as claimed in claim ~~4~~1, wherein the pre-wetting chemical solution contains oxidizing chemical for oxidizing the substrate surface from hydrophobic to hydrophilic.

~~12~~10. The method as claimed in claim ~~11~~9, wherein the oxidizing chemical is Ozone solution or SC1 solution.

~~13~~11. An apparatus for cleaning substrates, comprising:
a first chamber connected to a pump to form a vacuum environment in the first chamber;
a substrate holder set in the first chamber for holding the substrate;
a descum unit configured to remove scums or burrs in recessed areas of the substrate;

at least one sprayer configured to supply pre-wetting chemical solution or chemical mist onto the surface of the substrate to form a bubble less or bubble-free chemical liquid layer on the substrate; and

a second chamber equipped with an ultra/mega sonic device for cleaning the substrate.

1412. The apparatus as claimed in claim 1311, wherein the vacuum degree in the first chamber is set at 25Torr and above.

1513. The apparatus as claimed in claim 1311, further comprising a rotating driving device connected to the substrate holder.

1614. An apparatus for cleaning substrates, comprising:
a chamber connected to a pump to form a vacuum environment in the chamber;
a substrate holder set in the chamber for holding the substrate;
a descum unit configured to remove scums or burrs in recessed areas of the substrate;

at least one nozzle configured to supply pre-wetting chemical solution or chemical mist onto the surface of the substrate to form a bubble less or bubble-free chemical liquid layer on the substrate after the chamber is vacuumized to form a vacuum environment in the chamber; and

an ultra/mega sonic device configured to clean the substrate.

1715. The apparatus as claimed in claim 1614, wherein the vacuum degree is set at 25Torr and above.

1816. An apparatus for cleaning substrates, comprising:
a first chamber connected to a vaporized unit configured to vaporize pre-wetting chemical solution;
a substrate holder set in the first chamber for holding the substrate;

a descum unit configured to remove scums or burrs in recessed areas of the substrate;

at least one sprayer connected to the vaporized unit for supplying vaporized liquid molecules onto the surface of the substrate to form a bubble less or bubble-free pre-wetting chemical liquid layer on the substrate; and

a second chamber equipped with an ultra/mega sonic device for cleaning the substrate.

1917. An apparatus for cleaning substrates, comprising:

a chamber;

a vaporized unit configured to vaporize pre-wetting chemical solution;

a substrate holder set in the chamber for holding the substrate;

a descum unit configured to remove scums or burrs in recessed areas of the substrate;

at least one sprayer connected to the vaporized unit for supplying vaporized liquid molecules onto the surface of the substrate to form a bubble less or bubble-free pre-wetting chemical liquid layer on the substrate;

at least one nozzle configured to supply cleaning chemical solution or chemical mist onto the surface of the substrate for cleaning the substrate; and

an ultra/ mega sonic device configured to clean the substrate.