

WHAT IS CLAIMED IS:

1. A laser processing method of laser-processing a wafer along a plurality of streets formed in a lattice manner on a top surface of the wafer, the wafer having devices formed in a plurality of regions partitioned by the streets, the laser processing method comprising:

a wafer holding step of holding an undersurface of the wafer by a chuck table;

a resin supplying step of supplying a water-soluble liquid resin to the top surface of the wafer;

a protective film forming step of forming a protective film on the top surface of the wafer as a result of drying the water-soluble liquid resin by irradiating the water-soluble liquid resin with light from a single xenon flash lamp, wherein the single xenon flash lamp is generally linearly-shaped and is positioned above the wafer with a first end of the single xenon flash lamp being provided approximately above the center of the wafer and extending radially outwardly to a second end in the radial direction of the wafer;

a rotation step of rotating the wafer while pulsed light is applied from the single xenon flash lamp such that the entire surface of the wafer can be irradiated by the single xenon flash lamp;

a laser irradiating step of irradiating the wafer with a laser beam through the protective film along the streets; and

a cleaning step of cleaning the wafer after the laser irradiating step.

2. The laser processing method according to claim 1, wherein the pulsed light is applied at a light emission frequency of 3 Hz to 100 Hz, and energy per pulse is 10 J to 1000 J.
3. The laser processing method according to claim 1, wherein the thickness of the protective film formed as a result of the protective film forming step is 20 μm .
4. A laser processing method of laser-processing a wafer along a plurality of streets formed in a lattice manner on a top surface of the wafer, the wafer having devices formed in a plurality of regions partitioned by the streets, the laser processing method comprising:

a wafer holding step of holding an undersurface of the wafer by a chuck table provided within a protective film forming and cleaning unit, wherein the protective film forming and cleaning unit includes a water receiving portion that surrounds the chuck table;

a resin supplying step of supplying a water-soluble liquid resin to the top surface of the wafer;

a protective film forming step of forming a protective film on the top surface of the wafer as a result of drying the water-soluble liquid resin by irradiating the water-soluble liquid resin with light from a xenon flash lamp, wherein the xenon flash lamp is supported by a light source main body, and further wherein the light source main body has a shape that corresponds to the shape of the water receiving portion;

a laser irradiating step of irradiating the wafer with a laser beam through the protective film along the streets; and

a cleaning step of cleaning the wafer after the laser irradiating step.

5. The laser processing method according to claim 4, wherein:

the water receiving portion is generally cylindrical and includes an outer wall that defines an outer diameter; and

the light source main body includes a peripheral wall having substantially the same outer diameter as the outer diameter of the outer wall of the water receiving portion.

6. The laser processing method according to claim 4, wherein the light is pulsed light.

7. The laser processing method according to claim 6, wherein the pulsed light is applied at a light emission frequency of 3 Hz to 100 Hz, and energy per pulse is 10 J to 1000 J.

8. The laser processing method according to claim 4, wherein the thickness of the protective film formed as a result of the protective film forming step is 20 μm .