

WHAT IS CLAIMED IS:

1. A processing method of a workpiece, comprising:
forming a protective film consisting essentially of
a water-insoluble resin on a front surface of the
workpiece, wherein the water-insoluble resin is selected
from the group consisting of an acrylic-based resin, a
cellulose-based resin, or an epoxy-based resin;
processing the workpiece on which the protective
film is formed;
deteriorating the protective film by supplying an
organic solvent to a central part of the processed
workpiece with a solvent nozzle while rotating the
workpiece to cover the whole workpiece with the organic
solvent; and
removing the protective film from the front surface
of the workpiece by supplying cleaning water to the
deteriorated protective film with a water nozzle, wherein
the solvent nozzle is separate from the water nozzle;
wherein the organic solvent flows from the central
part toward a peripheral part of the workpiece to prevent
local drying of the workpiece, wherein a flow of the
cleaning water is started in a state in which the front
surface of the workpiece is covered by the organic
solvent.

2. The processing method of a workpiece according to claim 1,

wherein the organic solvent includes isopropyl alcohol.

3. The processing method of a workpiece according to claim 1,

wherein in the processing the workpiece on which the protective film is formed, a side of the front surface of the workpiece is irradiated with a laser beam with such a wavelength as to be absorbed by the workpiece and a processing mark obtained by partial removal of the workpiece is formed.

4. The processing method of a workpiece according to claim 1,

wherein in the processing the workpiece on which the protective film is formed, the workpiece is thinned by grinding a back surface of the workpiece while holding a side of the front surface of the workpiece by a chuck table with intermediary of the protective film.

5. The processing method of a workpiece according to claim 1,

wherein processing the workpiece on which the protective film is formed comprises removing part of the

workpiece by etching with the protective film as a mask,

wherein the etching is performed by at least one of wet etching and plasma etching.

6. The processing method of a workpiece according to claim 1, wherein the water-insoluble resin is the acrylic-based resin, or the epoxy-based resin.

7. A processing method of a workpiece comprising:

forming a protective film consisting essentially of a water-insoluble resin on a front surface of the workpiece,

wherein the water-insoluble resin is polyvinyl butyral;

processing the workpiece on which the protective film is formed;

deteriorating the protective film by supplying an organic solvent to the workpiece processed; and

removing the protective film from the front surface of the workpiece by supplying cleaning water to the protective film deteriorated,

wherein the organic solvent flows from the central part toward a peripheral part of the workpiece to prevent local drying of the workpiece,

wherein a flow of the cleaning water is started in a state in which the front surface of the workpiece is covered by the organic solvent.

8. The processing method of a workpiece according to claim 1,

wherein in forming the protective film, the water-insoluble resin is dried by applying heat to the water-insoluble resin.

9. The processing method of a workpiece according to claim 1,

wherein processing the workpiece on which the protective film is formed comprises removing part of the workpiece by wet etching with an etchant with the protective film as a mask,

wherein the etchant comprises an alkaline aqueous solution or an acid aqueous solution.

10. The processing method of a workpiece according to claim 9,

wherein the acid aqueous solution comprises one or more of hydrogen chloride or a mixture of phosphoric acid and sulfuric acid dissolved into water.

11. The processing method of a workpiece according to claim 1,

wherein the organic solvent comprises one or more of methanol, ethanol, toluene, acetone, or propylene glycol monomethyl ether.

12. The processing method of a workpiece according

to claim 1,

wherein deteriorating the protective film and removing the protective film are performed concurrently.

13. The processing method of a workpiece according to claim 1,

wherein processing the workpiece on which the protective film is formed comprises removing part of the workpiece by etching, with the protective film as a mask.

14. A processing method of a workpiece, comprising:

forming a protective film consisting essentially of a water-insoluble resin on a front surface of the workpiece wherein the water-insoluble resin is selected from the group consisting of an acrylic-based resin, a cellulose-based resin, or an epoxy-based resin;

processing the workpiece on which the protective film is formed comprising removing part of the workpiece by etching with the protective film as a mask, wherein the etching is performed by at least one of wet etching and plasma etching;

deteriorating the protective film by supplying an organic solvent to the workpiece processed; and

removing the protective film from the front surface of the workpiece by supplying cleaning water to the protective film deteriorated;

wherein the organic solvent flows from the central part toward a peripheral part of the workpiece to prevent local drying of the workpiece,

wherein a flow of the cleaning water is started in a state in which the front surface of the workpiece is covered by the organic solvent,

wherein the flow of the cleaning water is started before a flow of the organic solvent is stopped.

15. The processing method of a workpiece according to claim 14,

wherein the water-insoluble resin is the acrylic-based resin, or the epoxy-based resin, and wherein the etchant comprises an alkaline aqueous solution or an acid aqueous solution.

16. The processing method of a workpiece according to claim 1 wherein a flow of the cleaning water is started before a flow of the organic solvent is stopped.

17. The processing method of a workpiece according to claim 1 wherein a flow of the cleaning water is started while rotating the workpiece is continued.

18. The processing method of a workpiece according to claim 1 wherein the cleaning water is combined with air.

19. The processing method of a workpiece according to claim 1 wherein the water nozzle is moved radially while

the cleaning water is supplied.

20. The processing method of a workpiece according to claim 1 wherein a rotation speed of the workpiece is in a range of 100 rpm to 300 rpm, and a supply rate of the organic solvent is in a range of 10 ml/min to 100 ml/min.