What is claimed is:

1. A substrate processing method of processing a substrate having a conductive material exposed on a surface of the substrate, comprising:

dissolving an inert gas in a liquid at not less than a saturation solubility to replace oxygen dissolved in the liquid with the inert gas;

generating bubbles of the inert gas in the liquid by depressurizing the liquid in which the inert gas is dissolved;

supplying the liquid containing the bubbles to the surface of the substrate when the substrate is being transported; and

processing the substrate while supplying the liquid containing the bubbles to the surface of the substrate.

2. The substrate processing method according to claim 1, wherein diameters of the bubbles are not more than 1 μm.

3. The substrate processing method according to claim 1 or 2, wherein the saturation solubility of the inert gas is a saturation solubility under conditions of a temperature of 20°C and 1 atm.

4. The substrate processing method according to any one of claims 1 to 3, further comprising deaerating the liquid before dissolving the inert gas in the liquid.

5. The substrate processing method according to any one of claims 1 to 4, further comprising cooling the liquid before dissolving the inert gas in the liquid.

6. The substrate processing method according to claim 5, wherein the temperature of the cooled liquid is in a range of 5°C to 20°C

7. The substrate processing method according to any one of claims 1 to 6, further comprising repeating the process of dissolving the inert gas in the liquid at not less than the saturation solubility and the process of generating the bubbles of the inert gas in the liquid while circulating the liquid via a liquid tank.

8. The substrate processing method according to any one of claims 1 to 7, wherein the inert gas is a nitrogen gas or a noble gas.

9. The substrate processing method according to any one of claims 1 to 8, wherein the liquid is pure water or chemical liquid.

10. The substrate processing method according to claim 1, wherein:

processing of the substrate is a cleaning process of the substrate which is performed in a cleaning device;

the substrate is transported into the cleaning device with the liquid containing the bubbles existing on the surface of the substrate; and

the cleaned substrate is removed from the cleaning device while the cleaned substrate is in a wet state.

11. The substrate processing method according to claim 1, wherein:

processing of the substrate is a cleaning process of the substrate;

the substrate processing method further comprises drying the cleaned substrate in a drying device;

the substrate is transported into the drying device with the liquid containing the bubbles existing on the surface of the substrate; and

the dried substrate is removed from the drying device while the dried substrate is in a dried state.

12. The substrate processing method according to any one of claims 1 to 11, wherein:

processing of the substrate is a cleaning process of the substrate;

the substrate processing method further comprises polishing the substrate by rubbing the substrate against a polishing surface while supplying a polishing liquid onto the polishing surface; and

the cleaning process is performed after polishing of the substrate.

13. A substrate processing apparatus for processing a substrate having a conductive material exposed on a surface of the substrate, comprising:

an inert-gas dissolving device configured to dissolve an inert gas in a liquid at not less than a saturation solubility to replace oxygen dissolved in the liquid with the inert gas;

a bubble generating device configured to generate bubbles of the inert gas in the liquid by depressurizing the liquid in which the inert gas is dissolved;

a processing module configured to process the substrate while supplying the liquid containing the bubbles to the surface of the substrate; and

an inert-gas-dissolved liquid supply line arranged to deliver the liquid containing the bubbles to the processing module; and

a substrate transporting device configured to transport the substrate, the substrate transporting device including:

a robot hand configured to support the substrate; and

a shower nozzle arranged above the robot hand and coupled to the inert-gas-dissolved liquid supply line.

14. The substrate processing apparatus according to claim 13, wherein the bubble generating device is configured to generate the bubbles having diameters of not more than 1 μm.

15. The substrate processing apparatus according to claim 13 or 14, wherein the saturation solubility of the inert gas is a saturation solubility under conditions of a temperature of 20°C and 1 atm.

16. The substrate processing apparatus according to any one of claims 13 to 15, further comprising a deaeration device configured to deaerate the liquid, wherein the deaeration device is located upstream of the inert-gas dissolving device.

17. The substrate processing apparatus according to any one of claims 13 to 16, further comprising a liquid cooling device configured to cool the liquid, wherein the liquid cooling device is located upstream of the deaeration device.

18. The substrate processing apparatus according to claim 17, wherein the liquid cooling device is configured to cool the liquid, before the inert gas is dissolved in the liquid, to a temperature in a range of 5°C to 20°C

19. The substrate processing apparatus according to any one of claims 13 to 18, further comprising:

a liquid tank located upstream of the inert-gas dissolving device;

a pump configured to deliver the liquid stored in the liquid tank to the inert-gas dissolving device; and

a circulation line extending from a position downstream of the bubble generating device to the liquid tank and arranged to return the liquid containing the bubbles to the liquid tank.

20. The substrate processing apparatus according to any one of claims 13 to 19, wherein the inert gas is a nitrogen gas or a noble gas.

21. The substrate processing apparatus according to any one of claims 13 to 20, wherein the liquid is pure water or chemical liquid.

22. The substrate processing apparatus according to any one of claims 13 to 21, further comprising a CMP device configured to polish the substrate by rubbing the substrate against a polishing surface while supplying a polishing liquid onto the polishing surface,

wherein the processing module is a cleaning device configured to clean the substrate after a polishing operation of the CMP device.

23. A computer-readable storage medium storing therein a program for causing a computer to instruct a substrate processing apparatus to perform the substrate processing method according to any one of claims 1 to 12.