WHAT IS CLAIMED IS:

1. A gas treatment method of performing a gas treatment on a substrate having a recess, the gas treatment method comprising:

disposing the substrate having the recess in a chamber;

adjusting a pressure inside the chamber to a predetermined pressure by supplying a pressure adjustment gas into the chamber in an evacuated state to increase the pressure inside the chamber; and

subsequently, performing the gas treatment on a side wall of the recess of the substrate by causing a treatment reaction by a process gas in the chamber,

wherein the process gas causing the treatment reaction is used as at least a part of the pressure adjustment gas in the adjusting the pressure.

2. The gas treatment method of Claim 1, wherein an aspect ratio of the recess of the substrate is 25 or more.

3. The gas treatment method of Claim 1, wherein the gas treatment is an etching.

4. The gas treatment method of Claim 3, wherein the process gas includes a basic gas and a fluorine-containing gas, and etches a silicon oxide-based material present on the side wall of the recess of the substrate.

5. The gas treatment method of Claim 4, wherein the substrate includes a stacked structure portion formed by alternately stacking an SiO_2 film, which is the silicon oxide-based material, and an SiN film multiple times, and includes a hole as the recess formed in a stacked direction of the stacked structure portion, and

wherein in the performing the gas treatment, the SiO_2 film present on the side wall of the hole is etched.

6. The gas treatment method of Claim 4, wherein the pressure adjustment gas in the adjusting the pressure further includes an inert gas, in addition to the basic gas and the fluorine-containing gas as the process gas.

7. The gas treatment method of Claim 6, wherein the basic gas and the fluorine-containing gas, as the process gas, and the inert gas are supplied in the adjusting the pressure and are continuously supplied in the performing the gas treatment.

8. The gas treatment method of any one of Claims 4 to 7, wherein the basic gas is an NH_3 gas and the fluorine-containing gas is a HF gas.

9. The gas treatment method of any one of Claims 4 to 7, further comprising evacuating an interior of the chamber after the performing the gas treatment,

wherein the adjusting the pressure, the performing the gas treatment, and the evacuating the interior of the chamber are repeated multiple times.

10. A gas treatment device for performing a gas treatment on a substrate having a recess, the gas treatment device comprising:

a chamber configured to accommodate the substrate having the recess;

a stage disposed in the chamber and configured to place the substrate on the stage;

a gas supplier configured to supply a gas into the chamber;

an exhauster configured to exhaust an interior of the chamber; and

a controller,

wherein the controller is configured to execute:

disposing the substrate in the chamber;

adjusting a pressure inside the chamber to a predetermined pressure by supplying a pressure adjustment gas into the chamber in an evacuated state to increase the pressure inside the

chamber; and

subsequently, performing the gas treatment on a side wall of the recess of the substrate by causing a treatment reaction by a process gas in the chamber, and

wherein the controller is configured to perform a control such that the process gas causing the treatment reaction is used as at least a part of the pressure adjustment gas in the adjusting the pressure.

11. The gas treatment device of Claim 10, wherein an aspect ratio of the recess of the substrate is 25 or more.

12. The gas treatment device of Claim 10, wherein the gas treatment is an etching.

13. The gas treatment device of Claim 12, wherein the process gas includes a basic gas and a fluorine-containing gas, and etches a silicon oxide-based material present on the side wall of the recess of the substrate.

14. The gas treatment device of Claim 13, wherein the controller is configured to control the gas supplier such that the pressure adjustment gas in the adjusting the pressure further includes an inert gas, in addition to the basic gas and the fluorine-containing gas as the process gas.

15. The gas treatment device of Claim 14, wherein the controller is configured to control the gas supplier such that the basic gas and the fluorine-containing gas, as the process gas, and the inert gas are supplied in the adjusting the pressure and are continuously supplied in the performing the gas treatment.

16. The gas treatment device of any one of Claims 13 to 15, wherein the basic gas is an NH_3 gas and the fluorine-containing gas is a HF gas.

17. The gas treatment device of any one of Claims 13 to 15, wherein the controller is further configured to execute evacuating the interior of the chamber after the performing the gas treatment and is configured to perform control such that the adjusting the pressure, the performing the gas treatment, and the evacuating the interior of the chamber are repeated multiple times.

18. A gas treatment method of performing a gas treatment on a substrate having a recess, the gas treatment method comprising:

disposing the substrate having the recess in a chamber;

adjusting a pressure inside the chamber to a predetermined pressure by supplying a pressure adjustment gas into the chamber in an evacuated state to increase the pressure inside the chamber;

subsequently, performing the gas treatment on a side wall of the recess of the substrate by causing a treatment reaction by a process gas in the chamber; and

evacuating an interior of the chamber after the performing the gas treatment,

wherein the process gas causing the treatment reaction is used as at least a part of the pressure adjustment gas in the adjusting the pressure,

wherein the adjusting the pressure, the performing the gas treatment, and the evacuating the interior of the chamber are repeated multiple times, and

wherein in the performing the gas treatment, a temperature of the substrate is in a range of 75 degrees C to 150 degrees C.