WHAT IS CLAIMED IS:

1. A method of processing a substrate, comprising:

(a) supplying a first gas containing hydrogen and oxygen to the substrate;

(b) supplying a second gas containing nitrogen and hydrogen to the substrate;

(c) supplying a third gas containing a halogen element to the substrate;

(d) supplying a reaction gas to the substrate;

(e) performing (a) and (b), non-simultaneously and alternately, for a plurality of times; and

(f) forming a film on the substrate by performing (c) and (d) after performing (e).

2. The method of Claim 1, wherein in (e), (b) is performed after (a) is performed.

3. The method of Claim 1, wherein (a) is performed in an atmosphere where the first gas is physically adsorbed on the substrate.

4. The method of Claim 2, wherein (a) is performed in an atmosphere where the first gas is physically adsorbed on the substrate.

5. The method of Claim 1, wherein (b) is performed in an atmosphere where the second gas reacts with the first gas adsorbed on the substrate.

6. The method of Claim 2, wherein (b) is performed in an atmosphere where the second gas reacts with the first gas adsorbed on the substrate.

7. The method of Claim 1, wherein in (e), (a) is performed after (b) is performed.

8. The method of Claim 7, wherein (a) is performed in an atmosphere where the first gas is physically adsorbed on the substrate.

9. The method of Claim 1, wherein an oxide film is formed on a surface of the substrate.

10. The method of Claim 9, wherein the oxide film contains at least one or more selected from the group of Si, Al, Ge, Ga, Zr, Ti, and Hf.

11. The method of Claim 1, wherein the first gas contains at least one or more selected from the group of: H_2 and O_2; H_2O; and H_2O_2.

12. The method of Claim 1, wherein the second gas contains at least one or more selected from the group of: NH_3; N_2 and H_2; N_2H_2; N_3H_3; N_2H_4; and other gases containing an amine group.

13. The method of Claim 1, wherein the third gas contains Cl or F as the halogen element, and contains at least one or more selected from the group of a Group IV element and a Group VI element, wherein the Group IV element includes Ti, Zr, or Hf and the Group VI element includes Mo or W.

14. A method of manufacturing a semiconductor device, comprising:

(a) supplying a first gas containing hydrogen and oxygen to a substrate;

(b) supplying a second gas containing nitrogen and hydrogen to the substrate;

(c) supplying a third gas containing a halogen element to the substrate;

(d) supplying a reaction gas to the substrate;

(e) performing (a) and (b), non-simultaneously and alternately, for a plurality of times;

and

(f) forming a film on the substrate by performing (c) and (d) after performing (e).

15. A program that causes, by a computer, a substrate processing apparatus to perform a process comprising:

(a) supplying a first gas containing hydrogen and oxygen to a substrate;

(b) supplying a second gas containing nitrogen and hydrogen to the substrate;

(c) supplying a third gas containing a halogen element to the substrate;

(d) supplying a reaction gas to the substrate;

(e) performing (a) and (b), non-simultaneously and alternately, for a plurality of times; and

(f) forming a film on the substrate by performing (c) and (d) after performing (e).

16. A substrate processing apparatus comprising:

a gas supply system configured to supply a first gas containing hydrogen and oxygen, a second gas containing nitrogen and hydrogen, a third gas containing a halogen element, and a reaction gas to a substrate; and

a controller configured to be capable of controlling the gas supply system to perform a process including:

(a) supplying the first gas containing hydrogen and oxygen to the substrate;

(b) supplying the second gas containing nitrogen and hydrogen to the substrate;

(c) supplying the third gas containing the halogen element to the substrate;

(d) supplying the reaction gas to the substrate;

(e) performing (a) and (b), non-simultaneously and alternately, for a plurality of times; and

(f) forming a film on the substrate by performing (c) and (d) after performing

(e).