WHAT IS CLAIMED IS:

1. A method of processing a substrate, comprising:

forming a film containing silicon, a predetermined element, and nitrogen on the substrate by performing a cycle a predetermined number of times, the cycle including:

(a) forming a first layer by supplying a first gas, which contains silicon and halogen and does not contain a Si-Si bond, to the substrate;

(b) forming a second layer by supplying a second gas, which is an inorganic-based gas and contains a Si-Si bond, to the substrate;

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

(d) modifying the first layer and the second layer by supplying a fourth gas containing nitrogen to the substrate,

wherein an element capable of forming defects in the film is used as the predetermined element, and

wherein in the cycle, (a) to (d) are performed in an order of: (a), (c), (b), and (d); (c), (a), (b), and (d); or (c), (a), (c), (b), and (d).

2. The method of Claim 1, wherein at least a portion of an execution period of (a) overlaps with at least a portion of an execution period of (c).

3. The method of Claim 2, wherein the execution period of (c) does not overlap with an execution period of (b).

4. The method of Claim 2, wherein the execution period of (c) does not overlap with an execution period of (d).

5. The method of Claim 1, wherein in the cycle, (a) to (d) are performed in the order of (a), (c), (b), and (d).

6. The method of Claim 1, wherein in the cycle, (a) to (d) are performed in the order of (c), (a), (b), and (d).

7. The method of Claim 1, wherein in the cycle, (a) to (d) are performed in the order of (c), (a), (c), (b), and (d).

8. The method of Claim 1, wherein at least one selected from the group of carbon and boron is used as the predetermined element.

9. The method of Claim 1, wherein at least one gas selected from the group of a hydrocarbon-based gas, an amine-based gas, a boron chloride-based gas, and a borohydride-based gas is used as the third gas.

10. The method of Claim 1, wherein a concentration of the predetermined element in the film is 5 atom% or less.

11. The method of Claim 10, wherein the concentration of the predetermined element in the film is 1 atom% or more.

12. The method of Claim 1, wherein the film is a charge trap film of a nonvolatile memory cell.

13. The method of Claim 1, wherein the cycle further includes (e) supplying a fifth gas containing a second predetermined element to the substrate, and

wherein at least a portion of an execution period of (c) overlaps with at least a portion of an execution period of (e).

14. The method of Claim 1, wherein the cycle further includes (e) supplying a fifth gas containing a second predetermined element to the substrate, and

wherein an execution period of (c) is continuous with an execution period of (e).

15. The method of Claim 1, wherein, when the first gas alone exists in a space where the substrate is placed, a temperature of the substrate in (a) is set to a temperature lower than the temperature at which the first gas is substantially thermally decomposed, and

wherein, when the second gas alone exists in the space where the substrate is placed, the temperature of the substrate in (b) is set to a temperature at which the second gas is substantially thermally decomposed.

16. The method of Claim 15, wherein the temperature of the substrate in (a) and (b) is 450 degrees C or higher and 750 degrees C or lower.

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

forming a film containing silicon, a predetermined element, and nitrogen on the substrate by performing a cycle a predetermined number of times, the cycle including:

(a) forming a first layer by supplying a first gas, which contains silicon and halogen and does not contain a Si-Si bond, to the substrate;

(b) forming a second layer by supplying a second gas, which is an inorganic-based gas and contains a Si-Si bond, to the substrate;

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

(d) modifying the first layer and the second layer by supplying a fourth gas containing nitrogen to the substrate,

wherein an element capable of forming defects in the film is used as the predetermined element, and

wherein in the cycle, (a) to (d) are performed in an order of: (a), (c), (b), and (d); (c), (a), (b), and (d); or (c), (a), (c), (b), and (d).

18. A substrate processing apparatus comprising:

a first gas supply system configured to supply a first gas, which contains silicon and halogen and does not contain a Si-Si bond, to the substrate;

a second gas supply system configured to supply a second gas, which is an inorganic-based gas and contains a Si-Si bond, to the substrate;

a third gas supply system configured to supply a third gas, which contains a predetermined element capable of forming defects in the film, to the substrate;

a fourth gas supply system configured to supply a fourth gas containing nitrogen to the substrate; and

a controller configured to be capable of controlling the first gas supply system, the second gas supply system, the third gas supply system, and the fourth gas supply system to perform a process including:

forming the film, which contains silicon, the predetermined element, and nitrogen, on the substrate by performing a cycle a predetermined number of times, the cycle including:

(a) forming a first layer by supplying the first gas to the substrate;

(b) forming a second layer by supplying the second gas to the substrate;

(c) supplying the third gas to the substrate; and

(d) modifying the first layer and the second layer by supplying the fourth gas to the substrate,

wherein in the cycle, (a) to (d) are performed in an order of: (a), (c), (b), and (d); (c), (a), (b), and (d); or (c), (a), (c), (b), and (d).

19. A program that causes, by a computer, a substrate processing apparatus that performs a film-forming process on a substrate to perform a process, in a process container included in the substrate processing apparatus, comprising:

forming a film containing silicon, a predetermined element, and nitrogen on the substrate by performing a cycle a predetermined number of times, the cycle including:

(a) forming a first layer by supplying a first gas, which contains silicon and halogen and does not contain a Si-Si bond, to the substrate;

(b) forming a second layer by supplying a second gas, which is an inorganic-based gas and contains a Si-Si bond, to the substrate;

(c) supplying a third gas containing the predetermined element to the substrate, the predetermined element is capable of forming defects in the film; and

(d) modifying the first layer and the second layer by supplying a fourth gas containing nitrogen to the substrate,

wherein in the cycle, (a) to (d) are performed in an order of: (a), (c), (b), and (d); (c), (a), (b), and (d); or (c), (a), (c), (b), and (d).