WHAT IS CLAIMED IS:

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

forming a film containing a first element on a substrate by performing a cycle multiple times, the cycle including performing:

(a) supplying a first precursor gas containing the first element and a halogen element to the substrate to form a first layer containing the first element and the halogen element with a thickness of less than one atomic layer-, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element~~on the substrate~~;

(b) supplying a second precursor gas containing the first element and the halogen element to the substrate, a molecule of the second precursor gas containing a bond between atoms of the first element therein, on which the first layer is formed, to thereby form a second layer-with a thickness of more than one atomic layer~~on the substrate, wherein a molecule of the second precursor gas contains a bond between atoms of the first element~~; and

(c) supplying a reaction gas to the substrate~~–~~ after (b)~~on which the second layer is formed~~.

2. The method of Claim 1, wherein the first layer is formed to have a uniform thickness~~on the substrate~~.

3. The method of Claim 1, wherein the first layer has no adsorption site on which the first element is adsorbed.

4. The method of Claim 3, wherein the first layer suppresses the first element in the first precursor gas from being adsorbed on the first layer.

5. The method of Claim 1, wherein bonding hands other than bonding hands adsorbed on a surface of the substrate, among a plurality of bonding hands of the first element constituting the

first layer, are terminated by the halogen element.

6. The method of Claim 1, wherein in (b), the bond between the atoms of the first element ~~and the first element~~ is adsorbed on an adsorption site left at a portion where the first layer is not formed ~~on the substrate~~.

7. The method of Claim 1, wherein the bond between the atoms of the first element ~~and the first element~~ is formed by bonding the first element having a dangling bond, which is generated by pyrolysis of the second precursor gas, to each other.

~~8. The method of Claim 1, wherein the first precursor gas is a gas not containing the bond between the first element and the first element.~~

8~~9~~. The method of Claim 1, wherein a temperature of the substrate in (a) is set to a temperature lower than a temperature at which the first precursor gas is pyrolyzed when the first precursor gas exists alone in a process chamber, and

wherein a temperature of the substrate in (b) is set to a temperature higher than a temperature at which the second precursor gas is pyrolyzed when the second precursor gas exists alone in a process chamber.

9~~10~~. The method of Claim 1, wherein a temperature of the substrate in (a) is substantially equal to a temperature of the substrate in (b).

10~~1~~. The method of Claim 1, wherein a gas, which contains at least any one selected from the group of a nitriding gas and an oxidizing gas, is used as the reaction gas.

11~~2~~. A method of manufacturing a semiconductor device, comprising:

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

(a) supplying a first precursor gas containing the first element and a halogen

element to the substrate to form a first layer, which contains the first element and the halogen element and suppresses the first element from being adsorbed on the first layer, with a thickness of less than one atomic layer, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element;

(b) supplying a second precursor gas containing the first element and the halogen element to the substrate, on which the first layer is formed, to thereby form a second layer, which contains the first element and the halogen element, wherein a molecule of the second precursor gas contains a bond between atoms of the first element; and

(c) supplying a reaction gas to the substrate after (b).

123. The method of Claim 112, wherein bonding hands other than bonding hands adsorbed on a surface of the substrate among a plurality of bonding hands of the first element constituting the first layer are terminated by the halogen element.

134. The method of Claim 112, wherein the second layer containing a bond between the atoms of the first element is formed to have a thickness of more than one atomic layer in (b).

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

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

(a) supplying a first precursor gas containing the first element and a halogen element and not containing any bond between atoms of the first element to the substrate to form a first layer containing the first element and the halogen element;

(b) supplying a second precursor gas containing the first element and thea halogen element to the substrate, on which the first layer is formed to thereby form a second layer containing the first element, wherein a molecule of the

second precursor gas contains a bond between atoms of the first element; and

(c) supplying a reaction gas to the substrate after (b)~~on which the second layer is formed~~.

15~~6~~. The method of Claim 14~~5~~, wherein in the first precursor gas, a number of the first element contained in one molecule is one.

16~~7~~. The method of Claim 14~~5~~, wherein the second layer containing the bond between the atoms of the first element ~~and the first element~~ is formed with a thickness of more than one atomic layer in (b).

17~~8~~. A substrate processing apparatus, comprising:

a process chamber in which a substrate is accommodated;

a first precursor gas supply system configured to supply a first precursor gas containing a first element and a halogen element into the process chamber, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element;

a second precursor gas supply system configured to supply a second precursor gas containing the first element and the halogen element into the process chamber, wherein a molecule of the second precursor gas contains a bond between atoms of the first element;

a reaction gas supply system configured to supply a reaction gas into the process chamber; and

a controller configured to be capable of controlling the first precursor gas supply system, the second precursor gas supply system, and the reaction gas supply system so as to perform a process including forming a film containing the first element on the substrate in the process chamber by performing a cycle multiple times, the cycle including performing:

(a) supplying a first precursor gas containing the first element and a halogen element to the substrate to form a first layer containing the first element with a thickness of less than one atomic layer on the substrate;

(b) supplying the~~a~~ second precursor gas ~~containing the first element and the halogen element~~ to the substrate, on which the first layer is formed, to thereby form a

second layer with a thickness of more than one atomic layer~~ on the substrate, wherein a molecule of the second precursor gas contains a bond between atoms of the first element~~; and

(c) supplying the reaction gas to the substrate~~ after~~ (b)~~on which the second layer is formed~~.

1~~8~~9. A program that causes, by a computer, a substrate processing apparatus to perform a process in a process chamber of the substrate processing apparatus, the process comprising:

forming a film containing a first element on a substrate by performing a cycle multiple times, the cycle including performing:

(a) supplying a first precursor gas containing the first element and a halogen element to the substrate to form a first layer containing the first element and the halogen element with a thickness of less than one atomic layer~~-~~, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element~~on the substrate~~;

(b) supplying a second precursor gas containing the first element and the halogen element to the substrate, a molecule of the second precursor gas containing a bond between the atoms of the first elements therein, on which the first layer is formed, to thereby form a second layer with a thickness of more than one atomic layer; and~~supplying a second precursor gas containing the first element and the halogen element to the substrate, on which the first layer is formed, to thereby form a second layer, wherein a molecule of the second precursor gas contains a bond between atoms of the first element; and~~

(c) supplying a reaction gas to the substrate~~ after~~ (b)~~on which the second layer is formed~~.

19~~2~~0. The method of Claim 1, wherein a composition ratio of the first element to the halogen element in the molecule of the second precursor gas is higher than a composition ratio of the first element to the halogen element in a molecule of the first precursor gas.

2~~0~~1. The method of Claim 1, wherein the second precursor gas is supplied to provide a bond

between the atoms of the ~~atoms of the~~ first element onto the substrate.

212. A substrate processing method, comprising:

forming a film containing a first element on a substrate by performing a cycle multiple times, the cycle including performing:

(a) supplying a first precursor gas containing the first element and a halogen element to the substrate to form a first layer containing the first element and the halogen element with a thickness of less than one atomic layer, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element~~on the substrate~~;

(b) supplying a second precursor gas containing the first element and the halogen element to the substrate, a molecule of the second precursor gas containing a bond between the atoms of the first element therein, on which the first layer is formed, to thereby form a second layer with a thickness of more than one atomic layer; and~~supplying a second precursor gas containing the first element and the halogen element to the substrate, on which the first layer is formed, to thereby form a second layer with a thickness of more than one atomic layer on the substrate, wherein a molecule of the second precursor gas contains a bond between atoms of the first element; and~~

(c) supplying a reaction gas to the substrate~~,~~ after (b)~~on which the second layer is formed~~.

223. A substrate processing method, comprising:

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

(a) supplying a first precursor gas containing the first element and a halogen element to the substrate to form a first layer, which contains the first element and the halogen element and suppresses the first element from being adsorbed on the first layer, with a thickness of less than one atomic layer, wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element~~on the substrate~~;

(b) supplying a second precursor gas containing the first element and the halogen element to the substrate, a molecule of the second precursor gas containing a bond between the atoms of the first element therein, on which the first layer is formed, to thereby form a second layer, which contains the first element; and~~supplying a second precursor gas containing the first element and the halogen element to the substrate, on which the first layer is formed, to thereby form a second layer, which contains the first element, on the substrate, wherein a molecule of the second precursor gas contains a bond between atoms of the first element; and~~

(c) supplying a reaction gas to the substrate~~ after (b)on which the second layer is formed~~.

2~~3~~4. A substrate processing method, comprising:

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

(a) supplying a first precursor gas containing the first element and a halogen element and not containing any bond between atoms of the first element ~~and any halogen element~~ to the substrate to form a first layer containing the first element and the halogen element~~on the substrate~~;

(b) supplying a second precursor gas containing the first element and a halogen element to the substrate, on which the first layer is formed to thereby form a second layer containing the first element~~ on the substrate~~, wherein a molecule of the second precursor gas contains a bond between atoms of the first element; and

(c) supplying a reaction gas to the substrate~~ after (b)on which the second layer is formed~~.

24. A substrate processing apparatus, comprising:

a process chamber in which a substrate is accommodated;

a first precursor gas supply system configured to supply a first precursor gas containing a first element and a halogen element into the process chamber**,** wherein a molecule of the first precursor gas does not contain a bond between atoms of the first element;

a second precursor gas supply system configured to supply a second precursor gas containing the first element and the halogen element into the process chamber, wherein a molecule of the second precursor gas contains a bond between atoms of the first element;

a reaction gas supply system configured to supply a reaction gas into the process chamber; and

a controller configured to be capable of controlling the first precursor gas supply system, the second precursor gas supply system, and the reaction gas supply system so as to perform a process including forming a film containing the first element on the substrate in the process chamber by performing a cycle a predetermined number of times, the cycle including performing:

(a) supplying the first precursor gas to the substrate to form a first layer, which contains the first element and the halogen element and suppresses the first element from being adsorbed on the first layer, with a thickness of less than one atomic layer;

(b) supplying the second precursor gas to the substrate, on which the first layer is formed, to thereby form a second layer with a thickness of more than one atomic layer; and

(c) supplying the reaction gas to the substrate after (b).

25. A substrate processing apparatus, comprising:

a process chamber in which a substrate is accommodated;

a first precursor gas supply system configured to supply a first precursor gas containing a first element and a halogen element and not containing any bond between atoms of the first element into the process chamber;

a second precursor gas supply system configured to supply a second precursor gas containing the first element and the halogen element into the process chamber, wherein a molecule of the second precursor gas contains a bond between atoms of the first element;

a reaction gas supply system configured to supply a reaction gas into the process chamber; and

a controller configured to be capable of controlling the first precursor gas supply system, the second precursor gas supply system, and the reaction gas supply system so as to perform a

process including forming a film containing the first element on the substrate in the process chamber by performing a cycle a predetermined number of times, the cycle including performing:

(a) supplying the first precursor gas to the substrate to form a first layer containing the first element and the halogen element with a thickness of less than one atomic layer;

(b) supplying the second precursor gas to the substrate on which the first layer is formed, to thereby form a second layer with a thickness of more than one atomic layer; and

(c) supplying the reaction gas to the substrate after (b).