WHAT IS CLAIMED IS:

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

(a) supplying a molybdenum-containing gas containing molybdenum and oxygen to a substrate in a process chamber;

(b) supplying an additive gas containing hydrogen to the substrate; and

(c) supplying a reducing gas containing hydrogen and having a chemical composition different from that of the additive gas to the substrate,

wherein at least two of (a), (b), and (c) are performed simultaneously or to partially overlap with each other in time one or more times or (a), (b), and (c) are performed sequentially one or more times to form a molybdenum film on the substrate,

wherein in (a) and (b), the supply of the molybdenum-containing gas is started in a state where the additive gas is not supplied to the substrate, and

wherein the supply of the molybdenum-containing gas is stopped in a state where the additive gas is supplied to the substrate.

2. The method of Claim 1, wherein the molybdenum-containing gas contains a halogen element.

3. The method of Claim 1, wherein the molybdenum-containing gas contains MoO_2Cl_2 (molybdenum dichloride dioxide), and

wherein the additive gas contains at least one selected from the group of SiH_4 (monosilane), NH_3 (ammonia), and C_5H_5N (pyridine).

4. The method of Claim 2, wherein the molybdenum-containing gas contains MoO_2Cl_2 (molybdenum dichloride dioxide), and

wherein the additive gas contains at least one selected from the group of SiH_4 (monosilane), NH_3 (ammonia), and C_5H_5N (pyridine).

5. The method of Claim 1, wherein a supply flow rate of the additive gas is larger than a supply flow rate of the molybdenum-containing gas and smaller than a supply flow rate of the reducing gas.

6. The method of Claim 2, wherein a supply flow rate of the additive gas is larger than a supply flow rate of the molybdenum-containing gas and smaller than a supply flow rate of the reducing gas.

7. The method of Claim 3, wherein a supply flow rate of the additive gas is larger than a supply flow rate of the molybdenum-containing gas and smaller than a supply flow rate of the reducing gas.

8. The method of Claim 1, wherein (b) is executed simultaneously or to overlap partially in time with (a) and time in (c) is shortened as compared with a case where (b) is not executed simultaneously with (a).

9. The method of Claim 2, wherein (b) is executed simultaneously or to overlap partially in time with (a) and time in (c) is shortened as compared with a case where (b) is not executed simultaneously with (a).

10. The method of Claim 3, wherein (b) is executed simultaneously or to overlap partially in time with (a) and time in (c) is shortened as compared with a case where (b) is not executed simultaneously with (a).

11. The method of Claim 5, wherein (b) is executed simultaneously or to overlap partially in time with (a) and time in (c) is shortened as compared with a case where (b) is not executed simultaneously with (a).

12. The method of Claim 1, wherein a total of a supply time of the additive gas and a supply time of the reducing gas is set to be a predetermined time.

13. The method of Claim 1, further comprising:

a first purge act of purging the process chamber after (a); and

a second purge act of purging the process chamber after (c),

wherein time in the first purge act is equal to or less than time in the second purge act.

14. The method of Claim 1, wherein (c) is performed after (a) and (b) are alternately performed one or more times.

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

(a) supplying a molybdenum-containing gas containing molybdenum and oxygen to a substrate in a process chamber of the substrate processing apparatus;

(b) supplying an additive gas containing hydrogen to the substrate; and

(c) supplying a reducing gas containing hydrogen and having a chemical composition different from that of the additive gas to the substrate,

wherein at least two of (a), (b), and (c) are performed simultaneously or to partially overlap with each other in time one or more times or (a), (b), and (c) are performed sequentially one or more times to form a molybdenum film on the substrate,

wherein in (a) and (b), the supply of the molybdenum-containing gas is started in a state where the additive gas is not supplied to the substrate, and

wherein the supply of the molybdenum-containing gas is stopped in a state where the additive gas is supplied to the substrate.

16. A substrate processing apparatus comprising:

a process chamber configured to accommodate a substrate;

a gas supply system configured to supply a molybdenum-containing gas containing molybdenum and oxygen, an additive gas containing hydrogen, and a reducing gas containing hydrogen and having a chemical composition different from that of the additive gas into the process chamber, respectively;

an exhaust system configured to exhaust an interior of the process chamber; and

a controller configured to be capable of controlling the gas supply system and the exhaust system to perform a process on the substrate accommodated in the process chamber, the process comprising:

(a) supplying the molybdenum-containing gas;

(b) supplying the additive gas; and

(c) supplying the reducing gas,

wherein at least two of (a), (b), and (c) are performed simultaneously or to partially overlap with each other in time one or more times or (a), (b), and (c) are performed sequentially one or more times to form a molybdenum film on the substrate,

wherein in (a) and (b), the supply of the molybdenum-containing gas is started in a state where the additive gas is not supplied to the substrate, and

wherein the supply of the molybdenum-containing gas is stopped in a state where the additive gas is supplied to the substrate.