WHAT IS CLAIMED IS:

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

(a) arranging a plurality of first substrates and a second substrate having a surface area smaller than a surface area of each of the first substrates in a direction perpendicular to a surface direction and accommodating the plurality of first substrates and the second substrate in a process chamber; and

(b) forming a thin film on each of the plurality of first substrates by supplying a processing gas to a substrate arrangement region in which the plurality of first substrates and the second substrate are arranged,

wherein (b) includes:

(c) supplying a dilution gas to at least one continuous first supply region, which includes a region where a part of the plurality of first substrates is arranged and does not include a region where the second substrate is arranged, of the substrate arrangement region, or not performing a supply of the dilution gas to the first supply region, and

supplying the dilution gas to at least one continuous second supply region, which is a region other than the first supply region and includes a region where the second substrate and another part of the plurality of first substrates are arranged, of the substrate arrangement region at a flow rate larger than a flow rate of the dilution gas supplied to the first supply region.

2. The method of Claim 1, wherein in (b), the processing gas is supplied to both the first supply region and the second supply region.

3. The method of Claim 1 or 2, wherein in (c), at least one selected from the group of a flow rate of the dilution gas supplied to the first supply region and a flow rate of the dilution gas supplied to the second supply region is adjusted so that a concentration of the processing

gas in the second supply region becomes closer to a concentration of the processing gas in the first supply region.

4. The method of Claim 1 or 2, wherein in (c), at least one selected from the group of a flow rate of the dilution gas supplied to the first supply region and a flow rate of the dilution gas supplied to the second supply region is adjusted so that a thickness of the thin film formed on each of the plurality of first substrates arranged in the second supply region becomes closer to a thickness of the thin film formed on each of the plurality of first substrates arranged in the first supply region.

5. The method of any one of Claims 1 to 4, wherein in (c), the dilution gas is supplied to the second supply region from a plurality of dilution gas nozzles different from a processing gas nozzle for supplying the processing gas.

6. The method of any one of Claims 1 to 4, wherein the at least one continuous second supply region includes a plurality of second supply regions, and the substrate arrangement region includes the plurality of second supply regions, and

wherein in (c), the dilution gas is individually supplied to the plurality of second supply regions from a plurality of dilution gas nozzles, respectively, which is installed such that each of the plurality of dilution gas nozzles respectively corresponds to each of the plurality of second supply regions.

7. The method of Claim 6, wherein in (c), flow rates of the dilution gas supplied to the plurality of second supply regions are individually adjusted.

8. The method of any one of Claims 5 to 7, wherein the plurality of dilution gas nozzles do not include a gas discharge hole formed at a position corresponding to the first supply

region, and includes a gas discharge hole formed at a position corresponding to the second supply region.

9. The method of Claim 5, wherein the processing gas nozzle is configured to supply the processing gas to both the first supply region and the second supply region.

10. The method of any one of Claims 1 to 9, wherein (b) further includes performing a cycle a predetermined number of times, the cycle including non-simultaneously performing:

(d) supplying a precursor gas to the substrate arrangement region; and

(e) supplying a reaction gas to the substrate arrangement region, and

wherein (c) is performed in (d).

11. The method of any one of Claims 1 to 4, wherein the substrate arrangement region includes at least a first zone on a first end of the substrate arrangement region, a second zone on a central portion of the substrate arrangement region, and a third zone on a second end of the substrate arrangement region,

wherein the second zone corresponds to the first supply region, and the first zone and the third zone correspond to the second supply region, and

wherein in (c), the dilution gas is supplied toward the first zone from a first dilution gas nozzle installed so as to correspond to the first zone, and the dilution gas is supplied toward the third zone from a third dilution gas nozzle installed so as to correspond to the third zone.

12. The method of Claim 11, wherein in (c), a supply of the dilution gas to the second zone is not performed.

13. The method of Claim 12, wherein in (c), the dilution gas is supplied toward the second zone from a second dilution gas nozzle installed so as to correspond to the second zone.

14. The method of any one of Claims 1 to 4, wherein the at least one continuous first supply region includes a plurality of first supply regions, and the substrate arrangement region includes the plurality of first supply regions, and

wherein in (c), the dilution gas is individually supplied to the plurality of first supply regions from a plurality of dilution gas nozzles, respectively, which is installed such that each of the plurality of dilution gas nozzles respectively corresponds to each of the plurality of first supply regions.

15. The method of Claim 14, wherein in (c), flow rates of the dilution gas supplied to the plurality of first supply regions are individually adjusted.

16. A substrate processing method, comprising:

(a) arranging a plurality of first substrates and a second substrate having a surface area smaller than a surface area of each of the first substrates in a direction perpendicular to a surface direction and accommodating the plurality of first substrates and the second substrate in a process chamber; and

(b) forming a thin film on each of the plurality of first substrates by supplying a processing gas to a substrate arrangement region in which the plurality of first substrates and the second substrate are arranged,

wherein (b) includes:

(c) supplying a dilution gas to at least one continuous first supply region, which includes a region where at least a part of the plurality of first substrates is arranged and does not include a region where the second substrate is arranged, of the

substrate arrangement region, or not performing a supply of the dilution gas to the first supply region, and

supplying the dilution gas to at least one continuous second supply region, which is a region other than the first supply region and includes a region where the second substrate and at least another part of the plurality of first substrates are arranged, of the substrate arrangement region at a flow rate larger than a flow rate of the dilution gas supplied to the first supply region.

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

(a) arranging a plurality of first substrates and a second substrate having a surface area smaller than a surface area of each of the first substrates in a direction perpendicular to a surface direction and accommodating the plurality of first substrates and the second substrate in a process chamber of the substrate processing apparatus; and

(b) forming a thin film on each of the plurality of first substrates by supplying a processing gas to a substrate arrangement region in which the plurality of first substrates and the second substrate are arranged,

wherein (b) includes:

supplying a dilution gas to at least one continuous first supply region, which includes a region where at least a part of the plurality of first substrates is arranged and does not include a region where the second substrate is arranged, of the substrate arrangement region, or not performing a supply of the dilution gas to the first supply region, and

supplying the dilution gas to at least one continuous second supply region, which is a region other than the first supply region and includes a region where the second substrate and at least another part of the plurality of first substrates are

arranged, of the substrate arrangement region at a flow rate larger than a flow rate of the dilution gas supplied to the first supply region.

18. A substrate processing apparatus, comprising:

a substrate support configured to arrange a plurality of first substrates and a second substrate having a surface area smaller than a surface area of each of the first substrates in a direction perpendicular to a surface direction and support the plurality of first substrates and the second substrate;

a process chamber configured to accommodate the substrate support that supports the plurality of first substrates and the second substrate;

a processing gas supplier configured to supply a processing gas to a substrate arrangement region in which the plurality of first substrates and the second substrate are arranged; and

a dilution gas supplier configured to:

supply a dilution gas to at least one continuous first supply region, which includes a region where at least a part of the plurality of first substrates is arranged and does not include a region where the second substrate is arranged, of the substrate arrangement region, or not perform a supply of the dilution gas to the first supply region, and

supply the dilution gas to at least one continuous second supply region, which is a region other than the first supply region and includes a region where the second substrate and at least another part of the plurality of first substrates are arranged, of the substrate arrangement region at a flow rate larger than a flow rate of the dilution gas supplied to the first supply region.

19. A substrate processing apparatus, comprising:

a substrate support configured to support a plurality of first substrates and a second substrate having a surface area smaller than a surface area of each of the first substrates in a horizontal posture and in multiple stages;

a process chamber configured to accommodate the substrate support that supports the plurality of first substrates and the second substrate;

a processing gas nozzle installed so as to extend upward in the process chamber along a direction in which the plurality of first substrates and the second substrate are arranged, and configured to supply a processing gas into the process chamber; and

a dilution gas nozzle installed so as to extend upward in the process chamber along the direction in which the plurality of first substrates and the second substrate are arranged, and configured to supply a dilution gas into the process chamber,

wherein the dilution gas nozzle is configured to:

not supply a dilution gas to at least one continuous first supply region, which includes a region where at least a part of the plurality of first substrates is arranged and does not include a region where the second substrate is arranged, of a substrate arrangement region where the plurality of first substrates and the second substrate are arranged, and

supply the dilution gas to at least one continuous second supply region, which is a region other than the first supply region and includes a region where the second substrate and at least another part of the plurality of first substrates are arranged, of the substrate arrangement region.