[CLAIMS]

[Claim 1]

A substrate processing apparatus comprising:

a process vessel provided with a process region ~~in which~~capable of accommodating one or more substrates ~~are processed~~ arranged therein;

a first ~~nozzle~~ supplier provided with a plurality of first gas supply holes, through which a first gas is supplied to the one or more substrates, arranged over an entirety of the process region;

a second ~~nozzle~~ supplier provided with a plurality of second gas supply holes, through which a second gas reacting with the first gas is supplied to the one or more substrates, arranged over the entirety of the process region;

a third ~~nozzle~~ supplier provided with one or more third gas supply holes, through which an adsorption inhibitory gas inhibiting an adsorption of the first gas is supplied to the one or more substrates, arranged corresponding to a part of the process region where an amount of reaction by-products is smaller than the other part of the process region when compared along a substrate arrangement direction; and

a ~~gas~~ supply system capable of supplying the first gas, the second gas and the adsorption inhibitory gas to the one or more substrates through the first ~~nozzle~~supplier, the second ~~nozzle~~supplier and the third ~~nozzle~~supplier, respectively.

[Claim 2]

The substrate processing apparatus of claim 1, wherein the one or more third gas supply holes are provided at the third ~~nozzle~~ supplier at one or more positions corresponding to one or more lower substrates among the one or more substrates located in a lower end portion of the process region.

[Claim 3]

The substrate processing apparatus of claim 2, wherein a plurality of fourth gas supply holes are further provided at the third ~~nozzle~~ supplier at positions corresponding

to upper substrates among the one or more substrates located in an upper end portion of the process region.

[Claim 4]

The substrate processing apparatus of claim 3, wherein an opening ratio of each of the one or more third gas supply holes is greater than an opening ratio of each of the plurality of fourth gas supply holes.

[Claim 5]

The substrate processing apparatus of claim 1, wherein a length of the third ~~nozzle~~ supplier is shorter than that of the first ~~nozzle~~ supplier and that of the second ~~nozzle~~supplier.

[Claim 6]

The substrate processing apparatus of claim 1, wherein the one or more third gas supply holes are provided at the third supplier~~nozzle~~ at one or more positions corresponding to one or more upper substrates among the one or more substrates located in an upper end portion of the process region.

[Claim 7]

The substrate processing apparatus of claim 1, wherein the one or more third gas supply holes are provided at the third ~~nozzle~~ supplier at one or more positions corresponding to one or more central substrates among the one or more substrates located in a central portion of the process region.

[Claim 8]

The substrate processing apparatus of claim 1, wherein the one or more third gas supply holes are located at the third ~~nozzle~~supplier at one or more positions corresponding to one or more positions in the process region where a plurality of dummy substrates is~~are~~ located.

[Claim 9]

The substrate processing apparatus of claim 8, wherein the one or more third gas supply holes are located at the third ~~nozzle~~ supplier at one or more positions corresponding to one or more positions in the process region where some of the plurality of dummy substrates are densely arranged or a relatively large number of dummy substrates among the plurality of dummy substrates are arranged, and

a plurality of fourth gas supply holes are further located at the third ~~nozzle~~ supplier at positions corresponding to positions in the process region where some of the plurality of dummy substrates are sparsely arranged or a relatively small number of dummy substrates among the plurality of dummy substrates are arranged.

[Claim 10]

The substrate processing apparatus of claim 9, wherein an opening ratio of the one or more third gas supply holes is greater than an opening ratio of the plurality of fourth gas supply holes.

[Claim 11]

The substrate processing apparatus of claim 1, wherein the one or more third gas supply holes are located at the third ~~nozzle~~ supplier at one or more positions corresponding to one or more positions in the process region where a density of the one or more substrates is high.

[Claim 12]

The substrate processing apparatus of claim 1, further comprising

a controller configured to be capable of controlling the ~~gas~~ supply system.

[Claim 13]

The substrate processing apparatus of claim 12, wherein the supply system~~further~~ comprise~~ing~~s

———a fourth ~~nozzle~~supplier through which a third gas is supplied to the one or more substrates, and

wherein the controller is configured to be capable of controlling the ~~gas~~ supply system so as to perform:

——— (a) supplying the first gas to the one or more substrates;

——— (b) supplying the second gas to the one or more substrates;

——— (c) supplying the adsorption inhibitory gas to the one or more substrates;

——— (d) supplying the third gas to the one or more substrates; and

——— (e) performing (a) and (d) partially in parallel, then performing (c) and then performing (b).

[Claim 14]

The substrate processing apparatus of claim 12, wherein the supply system~~further~~ comprises~~ing:~~

———a fourth supplier~~nozzle~~ through which a third gas is supplied to the one or more substrates, and

wherein the controller is configured to be capable of controlling the ~~gas~~ supply system so as to perform:

——— (a) supplying the first gas to the one or more substrates;

——— (b) supplying the second gas to the one or more substrates;

——— (c) supplying the adsorption inhibitory gas to the one or more substrates;

——— (d) supplying the third gas to the one or more substrates; and

——— (f) performing (a) and (d) partially in parallel, then performing (a) and (c) in parallel, and then performing (b).

[Claim 15]

The substrate processing apparatus of claim 12, wherein the supply system~~further~~ comprises~~ing:~~

———a fourth ~~nozzle~~supplier through which a third gas is supplied to the one or more substrates, and

wherein the controller is configured to be capable of controlling the ~~gas~~ supply system so as to perform:

(a) supplying the first gas to the one or more substrates;

(b) supplying the second gas to the one or more substrates;

(c) supplying the adsorption inhibitory gas to the one or more substrates;

(d) supplying the third gas to the one or more substrates; and

(g) performing (a) and (d) partially in parallel, then performing (b), and then performing (c).

[Claim 16]

The substrate processing apparatus of claim 13, wherein the controller is further configured to be capable of controlling the ~~gas~~ supply system so as to perform:

(h) performing (c) after (e).

[Claim 17]

The substrate processing apparatus of claim 1, wherein the first gas comprises a gas containing a~~n~~ halogen element, the second gas comprises a reducing gas, and the adsorption inhibitory gas comprises a gas containing the halogen element.

[Claim 18]

The substrate processing apparatus of claim 1, wherein the adsorption inhibitory gas comprises constituents same as those of the reaction by-products generated by a reaction between the first gas and the second gas.

[Claim ~~18~~19]

A substrate processing method comprising:

(a) supplying a first gas to a substrate in a process vessel, wherein the process vessel is provided with:

a first ~~nozzle~~ supplier provided with a plurality of first gas supply holes, through which the first gas is supplied to one or more substrates provided in a process

region in which the substrate is processed, arranged over an entirety of the process region;

a second supplier~~nozzle~~ provided with a plurality of second gas supply holes, through which a second gas reacting with the first gas is supplied to the one or more substrates, arranged over the entirety of the process region; and

a third supplier~~nozzle~~ provided with one or more third gas supply holes, through which an adsorption inhibitory gas inhibiting an adsorption of the first gas is supplied to the one or more substrates, arranged corresponding to a part of the process region where an amount of reaction by-products is smaller than the other part of the process region when compared along a substrate arrangement direction;

(b) supplying the second gas to the substrate; and

(c) supplying the adsorption inhibitory gas to the substrate.

[Claim ~~19~~20]

A method of manufacturing a semiconductor device, comprising:

(a) supplying a first gas to a substrate in a process vessel, wherein the process vessel is provided with:

a first ~~nozzle~~ supplier provided with a plurality of first gas supply holes, through which the first gas is supplied to one or more substrates provided in a process region in which the substrate is processed, arranged over an entirety of the process region;

a second supplier~~nozzle~~ provided with a plurality of second gas supply holes, through which a second gas reacting with the first gas is supplied to the one or more substrates, arranged over the entirety of the process region; and

a third supplier~~nozzle~~ provided with one or more third gas supply holes, through which an adsorption inhibitory gas inhibiting an adsorption of the first gas is supplied to the one or more substrates, arranged corresponding to a part of the process region where an amount of reaction by-products is smaller than the other part of the process region when compared along a substrate arrangement direction;

(b) supplying the second gas to the substrate; and

(c) supplying the adsorption inhibitory gas to the substrate.

[Claim ~~20~~21]

A program that causes, by a computer, a substrate processing apparatus to perform:

(a) supplying a first gas to a substrate in a process vessel, wherein the process vessel is provided with:

a first ~~nozzle~~ supplier provided with a plurality of first gas supply holes, through which the first gas is supplied to one or more substrates provided in a process region in which the substrate is processed, arranged over an entirety of the process region;

a second supplier~~nozzle~~ provided with a plurality of second gas supply holes, through which a second gas reacting with the first gas is supplied to the one or more substrates, arranged over the entirety of the process region; and

a third supplier~~nozzle~~ provided with one or more third gas supply holes, through which an adsorption inhibitory gas inhibiting an adsorption of the first gas is supplied to the one or more substrates, arranged corresponding to a part of the process region where an amount of reaction by-products is smaller than the other part of the process region when compared along a substrate arrangement direction;

(b) supplying the second gas to the substrate; and

(c) supplying the adsorption inhibitory gas to the substrate.