

SOLUTION SUPPLY DEVICE AND SEMICONDUCTOR APPARATUS

FIELD OF THE INVENTION

The present invention relates to the field of semiconductor equipment, and further relates to a solution supply device and a semiconductor apparatus.

BACKGROUND

In semiconductor wet cleaning and etching equipment, different solutions need to be mixed in proportion. In order to ensure that the amount of etched thin film of a product is stable within a certain range, there are high requirements for the concentration stability of a mixed solution. Common mixed solutions include, for example, a mixture of water and 49% hydrofluoric acid (DHF solution), a mixture of ammonia, hydrogen peroxide, and water with a volume ratio of 1: 2: 50 (SC1 solution), and a mixture of hydrofluoric acid and nitric acid (HF/HNO₃ solution). By adjusting the flow rates of injected chemical solutions in different inlet pipelines, the existing device side controls the proportional volume of chemical solutions in each component, so as to achieve the purpose of configuring the solution of the target concentration.

However, due to limitations such as pipeline design and valve response control require a certain time, the concentration of the solution fluctuates greatly during the mixing process, and as the number of online real-time solution replacements increases, the concentration drift will have a cumulative effect, which will cause the etching amount of the solution to the product film to be unstable, and even lead to product scrapping.

For example, in the invention patent with application No. 200510075183.4, a chemical mixing and supply device and a method are disclosed. As shown in FIG. 1, the chemical mixing and supply device comprises a first chemical source portion 112, a second chemical source portion 122, a first delivery pipeline 114, a second delivery pipeline 124, a main delivery pipeline 140, a mixer 142 located on the main delivery pipeline 140, a first flow meter 116, and a fourth flow meter 126, a discharge pipeline 150, and a controller 130 for comparing the chemical mixing ratio calculated based on the data of flow rates provided by the first flow meter 116 and the fourth flow meter

126 with a preset chemical mixing ratio to control the flow rates of the chemicals. The discharge pipeline 150 is connected to the first delivery pipeline 114 and the second delivery pipeline 124, respectively, and the discharge pipeline 150 can be connected to the chemical source portions 112 and 122, respectively. Because the flow rates of the initially delivered chemicals are very unstable, the initially delivered chemicals are discharged through the discharge pipeline 150 for 3 to 5 seconds, after that, stable flow rates are maintained, i.e., the chemicals are discharged during the flow rate adjustment.

Although the discharge pipeline 150 described above can be used to discharge the chemicals having unstable flow rates in the first delivery pipeline 114 and the second delivery pipeline 124, it can prevent the chemicals having unstable flow rates from flowing to the main delivery pipeline 140 and the mixer 142. However, when the delivery of chemicals to the discharge pipeline 150 is stopped and the delivery of chemicals to the main delivery pipeline 140 is started, the chemicals delivered by the first delivery pipeline 114 and the second delivery pipeline 124 will be mixed in the main delivery pipeline 140, and the flow rates of chemicals in the first delivery pipeline 114 and the second delivery pipeline 124 will be sharply changed due to pipeline resistance and pressure variations inside the pipelines before and after the valves are opened and closed, thereby resulting in unstable flow rates of chemicals mixed and input to the main delivery pipeline 140 through the first delivery pipeline 114 and the second delivery pipeline 124, further resulting in a deviation in the mixing ratio of the chemicals delivered into the mixer 142 through the main delivery pipeline 140, and making a deviation in the concentration of the chemical solution supplied from the mixer 142 to a processing device 10.

Therefore, the present patent aims to improve the accuracy of the volume ratio of each chemical component in a mixed solution.

SUMMARY

In view of the above-described technical problems, an objective of the present invention is to improve the accuracy of the volume ratio of each chemical component in a mixed solution, and in order to achieve the above-described objective, the present invention provides a solution supply device and a semiconductor apparatus.

In some embodiments, the present invention provides a solution supply device for supplying mixed solution to a processing device, comprising:

a first solution inlet port, for receiving an injected first solution; a second solution inlet port, for receiving an injected second solution; a first delivery line, connected to the first solution inlet port; a second delivery line, connected to the second solution inlet port; a mixing tank, connected to the end of the first delivery line away from the first solution inlet port and the end of the second delivery line away from the second solution inlet port, for mixing the first solution and the second solution to form a mixed solution; a main delivery line, connected between the mixing tank and the processing device, for supplying the mixed solution to the processing device; a main discharge line, connected to the main delivery line; a control unit, in communication with the main discharge line and the main delivery line, for controlling the discharge of the mixed solution having an unstable flow rate through the main discharge line before the main delivery line supplies the mixed solution to the processing device.

In some embodiments, the present invention provides a semiconductor apparatus comprising a semiconductor processing device and the above-described solution supply device.

Compared with the prior art, the present invention has the following beneficial effects:

In the present invention, a main discharge line is added after the mixing of chemical solutions is completed, the solution with abnormal concentration caused by an unstable flow rate of the mixed solution at the initial stage is discharged through the main discharge line, and then the solution is supplied into the processing device after the flow rate of mixed solution is stabilized, so as to improve the accuracy of the volume ratio of each component in the mixed solution. The present invention also provides line-mounted pressure stabilizers to stabilize the delivered hydraulic pressure, so that the solution having a stable flow rate is delivered into the processing device, and the accuracy of the volume ratio of each component in the mixed solution is improved.

BRIEF DESCRIPTION OF THE DRAWINGS

The features and performance of the present invention are further described by the following embodiments and the accompanying drawings of the embodiments.

FIG. 1 is a schematic view of the configuration of a chemical mixing and a supplying device according to the background of the present invention;

FIG. 2 is a schematic view of a solution supply device according to an embodiment of the present invention;

FIG. 3 is a schematic view of a solution supply device according to another embodiment of the present invention;

FIG. 4 is a schematic view of a solution supply device according to another embodiment of the present invention;

FIG. 5 is a schematic view of a solution supply device according to another embodiment of the present invention.

PERFERRED EMBODIMENTS OF THE INVENTION

In order to more clearly explain the embodiments of the present invention or the technical solutions in the prior art, specific embodiments of the present invention will be described below with reference to the accompanying drawings. It is obvious that the drawings in the following description are only some embodiments of the present invention, and for those of ordinary skill in the art, other drawings and other embodiments can be obtained from these drawings without making creative efforts.

To simplify the drawings, only the parts related to the invention are schematically shown in each drawing, and the parts do not represent the actual structure of a product. Furthermore, for clarity and ease of understanding of the drawings, in some drawings, only one of the components with the same structure or function is schematically illustrated or marked. Herein, "one" can mean not only "one" but also "more than one."

Herein, it should be noted that unless otherwise clearly specified and defined, terms "mount," "interconnect," and "connect" should be interpreted broadly, for example, the connection can be a fixed connection, a detachable connection, or an

integral connection; the connection can be a mechanical connection or an electrical connection; the connection can be a direct connection, an indirect connection through an intermediate medium, or an internal connection between two elements. For those of ordinary skill in the art, the specific meanings of the above terms in the present invention can be understood according to specific circumstances.

Besides, in the description of the present application, terms such as "first" and "second" are used for distinguishing description only, and should not be construed as indicating or implying relative importance.

Embodiment 1

As shown in FIG. 2, the present embodiment discloses a solution supply device 200 comprising a first solution inlet port 211, a second solution inlet port 221, a first delivery line 210, a second delivery line 220, a main delivery line 230, a main discharge line 240, a mixing tank 250, and a control unit 270.

Wherein, the first solution inlet port 211 is used for receiving an injected first solution, the second solution inlet port 221 is used for receiving an injected second solution, and the above-described first solution is different from the second solution. The first delivery line 210 is connected to the first solution inlet port 211, the second delivery line 220 is connected to the second solution inlet port 221, and the mixing tank 250 is connected to the end of the first delivery line 210 away from the first solution inlet port 211 and the end of the second delivery line 220 away from the second solution inlet port 221, that is, the mixing tank 250 is provided at the junction of the first delivery line 210 and the second delivery line 220, or the first delivery line 210 and the second delivery line 220, respectively, are connected to the mixing tank 250 for mixing the solutions delivered by the first delivery line 210 and the second delivery line 220, respectively. The main delivery line 230 is connected between the mixing tank 250 and a processing device 300 for supplying a mixed solution to the processing device 300.

Besides, the main discharge line 240 is connected to the main delivery line 230, and functions as one branch of the main delivery line 230. The control unit 270 maintains communication with the main delivery line 230 and the main discharge line

240, respectively, for controlling the discharge of the solution having an unstable flow rate in the DR direction shown in FIG. 2 through the main discharge line 240 before the main delivery line 230 supplies the mixed solution to the processing device 300. According to this embodiment, the mixed solution in the mixing tank 250 can be stably delivered to the processing device 300, thereby improving the accuracy of the volume ratio of each component in the mixed solution, and ensuring that the mixed solution supplied to the processing device 300 has an accurate concentration every time.

The present application does not limit how the solution is discharged. In some embodiments, the main discharge line 240 is provided with a second regulating valve 241, the main delivery line 230 is provided with a first regulating valve 231 between the main discharge line 240 and the processing device 300, the first regulating valve 231 is located between the main discharge line 240 and the processing device 300, and the first regulating valve 231 and the second regulating valve 241 described above are respectively in communication with the control unit 270. Before the main delivery line 230 supplies the mixed solution to the processing device 300, the control unit 270 closes the first regulating valve 231 and opens the second regulating valve 241 to discharge the solution having an unstable flow rate through the main discharge line 240. However, when the main delivery line 230 supplies the mixed solution to the processing device 300, the control unit 270 first opens the first regulating valve 231. At this time, the solution in the main delivery line 230 is divided into two parts, one part is continuously discharged through the main discharge line 240, and the other part is supplied to the processing device 300. After the first regulating valve 231 and the second regulating valve 241 are simultaneously in an open state for a preset time, the flow rate of the solution in the main delivery line 230 tends to be stable, at this time, the second regulating valve 241 is closed, and all the solution in the main delivery line 230 is supplied to the processing device 300.

Preferably, the main discharge line 240 is provided with a second flowmeter 242, the main delivery line 230 is provided with a first flowmeter 232 between the main discharge line 240 and the processing device 300, and the first flowmeter 232 and the second flowmeter 242 described above are respectively in communication with the control unit 270. Wherein, before the main delivery line 230 supplies the mixed solution to the processing device 300, the second flowmeter 242 detects the flow value

when the flow rate of the solution in the main discharge line 240 is stable as a first detection value. When the main delivery line 230 supplies the mixed solution to the processing device 300, the flow rate of the solution in the main delivery line 230 will change due to the opening of the first regulating valve 231. At this time, the real-time value of the flow rate of the solution (that is, the flow rate of the solution in a branch 233 of the main delivery line 230) detected by the first flowmeter 232 and supplied from the main delivery line 230 to the processing device 300 is defined as a second detection value, and the real-time value of the flow rate of the solution in the main delivery line 240 detected by the second flowmeter 242 is defined as a third detection value. The control unit 270 regulates the opening rate of the first regulating valve 231 and the closing rate of the second regulating valve 241 so as to keep the sum of the second detection value and the third detection value equal to the first detection value, thereby maintaining the flow rate in the main delivery line 230 stable. Finally, the first regulating valve 231 is completely opened, and the second regulating valve 241 is completely closed, at this time, the second detection value is equal to the first detection value, and the third detection value is equal to zero.

Preferably, as shown in FIG. 3, the main delivery line 230 is also provided with a feed tank 234 (daily tank), and the feed tank 234 is located between the main discharge line 240 and the processing device 300 for buffering the mixed solution from the mixing tank 250 and supplying the mixed solution to the processing device 300. Furthermore, in the drawing of this embodiment, the feed tank 234 is provided after the first regulating valve 231 and the second flowmeter 242 and before the processing device 300 to improve the accuracy of the volume ratio of each component in the mixed solution entering the feed tank 234, so that the mixed solution supplied by the feed tank 234 to the processing device 300 has an accurate concentration every time.

In some embodiments, the first delivery line 210 is provided with a third regulating valve 212 and a third flowmeter 213, and the third regulating valve 212 is located between the first solution inlet port 211 and the third flowmeter 213. The second delivery line 220 is provided with a fourth regulating valve 222 and a fourth flowmeter 223, and the fourth regulating valve 222 is located between the second solution inlet port 221 and the fourth flowmeter 223, i.e., along the direction of solution flow in the first delivery line 210 or the second delivery line 220. The third flowmeter

213 is downstream of the third regulating valve 212, and the fourth flowmeter 223 is downstream of the fourth regulating valve 222, so as to detect an actual flow rate in the first delivery line 210 or the second delivery line 220 that may fluctuate due to the action of the third regulating valve 212 or the fourth regulating valve 222. Moreover, the third regulating valve 212 and the fourth regulating valve 222, as well as the third flowmeter 213 and the fourth flowmeter 223 described above, are respectively in communication with the control unit 270, the control unit 270 can receive a flow-information signal sent by the third flowmeter 213 and the fourth flowmeter 223, and the control unit 270 can control the opening degrees of the third regulating valve 212 and the fourth regulating valve 222 to regulate the flow rate in each line. It should be noted that the above-described first, second, third, and fourth regulating valves 231, 241, 212, and 222 are preferably flow control valves (FCV), or can be ordinary gate valves.

When the flow control valves are selected for the third regulating valve 212 and the fourth regulating valve 222, the control unit 270 can control the concentration ratio by controlling the flow ratio of the solutions in the first delivery line 210 and the second delivery line 220 respectively through the flow control valves, that is, the control unit 270 detects the data of flow rates in the first delivery line 210 and the second delivery line 220 through the third flowmeter 213 and the fourth flowmeter 223 respectively, calculates the flow ratio of different chemical solutions injected into the first solution inlet port 211 and the second solution inlet port 221, compares the calculated flow ratio with a preset solution volume mixing ratio to output a control signal for controlling the opening rates of the third regulating valve 212 and the fourth regulating valve 222, and then controls the concentration of the mixed solution, so that the first solution and the second solution are mixed to form the mixed solution having the above-mentioned preset solution volume mixing ratio, and then the preset concentration ratio is achieved.

In practical application, the first solution inlet port 211 is injected with hydrogen fluoride (HF) solution, and the second solution inlet port 221 is injected with deionized water (DIW) as an example:

Firstly, only the second, third, and fourth regulating valves 241, 212, and 222 are opened, the first regulating valve 231 is closed, the control unit 270 controls the

solution flow ratio of HF or DIW in the first delivery line 210 and the second delivery line 220 through the third regulating valve 212 and the fourth regulating valve 222, respectively, so as to adjust the concentration of the mixed solution in the mixing tank 250, and the HF/DIW mixed solution having a large flow fluctuation due to pressure or pipeline resistance variations is discharged through the main discharge line 240. Secondly, after the second flowmeter 242 detects that the flow rate of the solution in the main discharge line 240 is stable, the control unit 270 opens the first regulating valve 231 to inject the HF/DIW mixed solution having an stable flow rate into the feed tank 234, and during the above process, the control unit 270 regulates the opening rate of the first regulating valve 231 and the closing rate of the second regulating valve 241 according to the control mode described above to maintain the stability of the flow rate in the main delivery line 230.

Embodiment 2

As shown in FIG. 4, the present embodiment discloses a solution supply device 200. Similar to Embodiment 1, the solution supply device 200 comprises a first solution inlet port 211, a second solution inlet port 221, a first delivery line 210, a second delivery line 220, a main delivery line 230, a main discharge line 240, a mixing tank 250, a feed tank 234, and a control unit 270. The connection modes of the above-described components and lines are the same as the connection modes of Embodiment 1, and will not be repeated here. The difference between this embodiment and Embodiment 1 is that a buffer tank 214 and a circulation line 215 are added to the first delivery line 210, and a secondary discharge line 224 is added to the second delivery line 220.

Wherein, the buffer tank 214 is located between the first solution inlet port 211 and a third regulating valve 212, one end of the circulation line 215 is connected to the first delivery line 210 between the buffer tank 214 and the first solution inlet port 211, and the other end is connected to the first delivery line 210 between the buffer tank 214 and the third regulating valve 212, and the circulation line 215 is equipped with a fifth regulating valve 216 and a fifth flowmeter 217. One end of the secondary discharge line 224 is connected to the first delivery line 210 between the second solution inlet port 221 and a fourth regulating valve 222, and the secondary discharge line 224 is equipped with a sixth regulating valve 225 and a sixth flowmeter 226. The

fifth regulating valve 216, the sixth regulating valve 225, the fifth flowmeter 217, and the sixth flow meter 226 described above are also in communication with the control unit 270, respectively.

In practical application, the first solution inlet port 211 is injected with hydrogen fluoride (HF) solution, and the second solution inlet port 221 is injected with deionized water (DIW) as an example:

Firstly, only the fifth regulating valve 216 and the sixth regulating valve 225 are opened, and the first, second, third, and fourth regulating valves 231, 241, 212, and 222 are closed, the HF solution will circulate internally in the buffer tank 214 and the circulation line 215 at a set flow rate, and the DIW will begin a flow-rate stabilization control through the secondary discharge line 224. Secondly, when the flow rates of the HF solution and the DIW both reach the set values and stabilize for a period of time, the fifth regulating valve 216 and the sixth regulating valve 225 are closed, and the second, third, and fourth regulating valves 241, 212, and 222 are opened synchronously, and the first regulating valve 231 is still in a closed state. The HF solution stops entering the circulation line 215, the DIW stops being discharged through the secondary discharge line 224, the HF solution and the DIW will converge in the mixing tank 250, the HF/DIW mixed solution after passing through the mixing tank 250 flows to the main discharge line 240, and the HF/DIW mixed solution having a large flow fluctuation due to the pressure or pipeline resistance variations is discharged through the main discharge line 240. Finally, after the second flowmeter 242 detects that the flow rate is stable, the first regulating valve 231 is opened, and the HF/DIW mixed solution having the stable flow rate is injected into the feed tank 234.

Embodiment 3

As shown in FIG. 5, the present embodiment discloses a solution supply device 200. Similar to Embodiment 1, the solution supply device comprises a first solution inlet port 211, a second solution inlet port 221, a first delivery line 210, a second delivery line 220, a main delivery line 230, a mixing tank 250, a feed tank 234, and a control unit 270. Moreover, the connection modes of the above components and lines are the same as the connection modes of Embodiment 1, and will not be repeated here. The difference between this embodiment and Embodiment 1 is that a pressure stabilizer

260 is added to both the first delivery line 210 and the second delivery line 220.

In addition, because the first delivery line 210 and the second delivery line 220 respectively maintain a constant pressure inside the lines through the respective pressure stabilizers 260, the pressure of the solution entering the main delivery line 230 remains unchanged, thereby ensuring the effect of dynamic stability of the flow rate, that is, each pressure stabilizer 260 can play the same technical effect as the main discharge line 240 in Embodiment 1, so the main delivery line 230 may be omitted to the main discharge line 240 in the present embodiment. Wherein, the pressure stabilizer 260 can be a hydraulic balancing valve, or may be composed of a controller, a pressure sensor, and a flow regulating valve. The pressure sensor is connected to the inside of the line and transmits a pressure signal to the controller. The controller controls the opening degrees of the flow regulating valves according to the received pressure signal, so that the pressure in the lines is maintained in a constant state. The controller can be independent of the control unit 270 or a part of the control unit 270.

In practical application, the first solution inlet port 211 is injected with hydrogen fluoride (HF) solution, and the second solution inlet port 221 is injected with deionized water (DIW) as an example:

If the main delivery line 230 is connected to the main discharge line 240, the second, third, and fourth regulating valves 241, 212, and 222 are first opened, the first regulating valve 231 is closed, the HF solution and the DIW each flow through the respective line-mounted pressure stabilizers 260 before converging in the mixing tank 250, and the HF/DIW mixed solution is discharged through the main discharge line 240 for a specified time. Then, when the feed tank 234 needs to be replenished with solution, the second regulating valve 241 is closed, and the first regulating valve 231 is opened to inject the HF/DIW mixed solution having a stable flow rate into the feed tank 234.

If the main delivery line 230 is not connected to the main discharge line 240, the first, third, and fourth regulating valves 231, 212 and 222 are directly opened to make the HF solution and DIW each flow through the respective line-mounted pressure stabilizers 260 before converging in the mixing tank 250, and the HF/DIW mixed solution is injected into the feeding tank 234. The dynamic balance of the hydraulic

pressure in the main delivery line 230 is maintained by the pressure stabilizers 260 on the first and second delivery lines 210 and 220 to provide a stable flow rate to the feed tank 234, thereby ensuring the accuracy of the concentration of the HF/DIW mixed solution.

Embodiment 4

The present embodiment discloses a semiconductor apparatus comprising a processing device 300 and a solution supply device 200 in any of the above embodiments. The above-described processing device 300 includes, but is not limited to, a wafer cleaning tank or a wafer etching tank, and the solution supply device 200 can supply a mixed solution to one or more of the above-described wafer cleaning tanks and the wafer etching tanks through a main delivery line 230, thereby performing etching and cleaning processes on a wafer. In this embodiment, by providing the above-described solution supply device 200 in the semiconductor apparatus, it is possible to improve the stability of the amount of etched thin film in the etching process and improve the cleanliness of the substrate surface in the cleaning process.

It should be noted that all of the above-described embodiments can be freely combined as necessary. The above are only preferred embodiments of the present invention, and those of ordinary skill in the art can make some improvements and refinements without departing from the principles of the present invention, and these improvements and refinements should also be regarded as falling within the scope of protection of the present invention.

What is claimed is:

1. A solution supply device, for supplying a mixed solution to a processing device, comprising:

a first solution inlet port, for receiving an injected first solution;

a second solution inlet port, for receiving an injected second solution;

a first delivery line, connected to the first solution inlet port;

a second delivery line, connected to the second solution inlet port;

a mixing tank, connected to the end of the first delivery line away from the first solution inlet port and the end of the second delivery line away from the second solution inlet port, for mixing the first solution and the second solution to form the mixed solution;

a main delivery line, connected between the mixing tank and the processing device, for supplying the mixed solution to the processing device;

a main discharge line, connected to the main delivery line;

a control unit, in communication with the main discharge line and the main delivery line, for controlling the discharge of the mixed solution having an unstable flow rate through the main discharge line before the main delivery line supplies the mixed solution to the processing device.

2. The solution supply device according to claim 1, wherein:

the main discharge line is provided with a first regulating valve, and the first regulating valve is located between the main discharge line and the processing device;

the main discharge line is provided with a second regulating valve;

the control unit is in communication with the first regulating valve and the second regulating valve, respectively, and is configured to: before the main delivery line

supplies the mixed solution to the processing device, the control unit closes the first regulating valve and opens the second regulating valve to discharge the mixed solution having an unstable flow rate through the main discharge line; and

when the main delivery line supplies the mixed solution to the processing device, the control unit controls the first regulating valve to open, and controls both the first regulating valve and the second regulating valve to be in an open state for a preset time, and then closes the second regulating valve.

3. The solution supply device according to claim 1, wherein:

the main discharge line is sequentially provided with a first regulating valve and a first flowmeter, and the first regulating valve and the first flowmeter are located between the main discharge line and the processing device;

the main discharge line is sequentially provided with a second regulating valve and a second flowmeter;

the control unit is in communication with the first regulating valve, the first flowmeter, the second regulating valve, and the second flowmeter, respectively, and is configured to:

before the main delivery line supplies the mixed solution to the processing device, the control unit closes the first regulating valve and opens the second regulating valve, and the second flowmeter detects a flow value when the flow rate of the solution in the main discharge line is stable as a first detection value;

when the main delivery line supplies the mixed solution to the processing device, the first flowmeter detects the real-time value of the flow rate of the solution delivered by the main delivery line to the processing device as a second detection value, the second flowmeter detects the real-time value of the flow rate of the solution in the main discharge line as a third detection value, and the control unit regulates the opening rate of the first regulating valve and the closing rate of the second regulating valve, such that the sum of the second detection value and the third detection value is equal to the first detection value.

4. The solution supply device according to claim 1, wherein the main delivery line is provided with a feed tank, and the feed tank is located between the main discharge line and the processing device for buffering the mixed solution from the mixing tank and supplying the mixed solution to the processing device.

5. The solution supply device according to claim 1, wherein,

the first delivery line is provided with a third regulating valve and a third flowmeter;

the second delivery line is provided with a fourth regulating valve and a fourth flowmeter;

the control unit is further configured to receive the data of the flow rates detected by the third flowmeter and the fourth flowmeter, calculate the flow ratio of the first solution and the second solution, compare the flow ratio with a preset mixing ratio to output a control signal for controlling opening rates of the third regulating valve and the fourth regulating valve, so as to make the first solution and the second solution to be mixed to form the mixed solution having the preset mixing ratio.

6. The solution supply device according to claim 1, wherein each of the first delivery line and the second delivery line is provided with a pressure stabilizer for stabilizing the hydraulic pressure in the first delivery line and the second delivery line.

7. The solution supply device according to claim 1, further comprising:

a buffer tank, provided on the first delivery line;

a circulation line, connected to the first delivery line at the inlet and outlet ends of the buffer tank, for recovering the first solution having an unstable flow rate through the circulation line before the first delivery line supplies the first solution to the mixing tank.

8. The solution supply device according to claim 1 or 7, further comprising:

a secondary discharge line, connected to the second delivery line, for discharging

the second solution having an unstable flow rate through the secondary discharge line before the second delivery line supplies the second solution to the mixing tank.

9. A solution supply device for supplying a mixed solution to a processing device, comprising:

- a first solution inlet port, for receiving an injected first solution;

- a second solution inlet port, for receiving an injected second solution;

- a first delivery line, connected to the first solution inlet port;

- a second delivery line, connected to the second solution inlet port;

- a mixing tank, connected to the end of the first delivery line away from the first solution inlet port and the end of the second delivery line away from the second solution inlet port, for mixing the first solution and the second solution to form the mixed solution;

- a main delivery line, connected between the mixing tank and the processing device, for supplying the mixed solution to the processing device;

wherein each of the first delivery line and the second delivery line is provided with a pressure stabilizer for stabilizing the hydraulic pressure in the first delivery line and the second delivery line.

10. A semiconductor apparatus, comprising a processing device for processing a semiconductor and a solution supply device according to any one of claims 1 to 9.