CLAIMS

[Claim 1]

A method for cleaning a copper-exposed substrate, comprising:

cleaning the substrate having at least copper or a copper compound exposed on a surface with carbonated water in which concentration of hydrogen peroxide dissolved in water is limited to 2 μg/L or less and to which carbon dioxide is added to adjust resistivity to be within a range of 0.03 to 5.0 MΩ·cm.

[Claim 2]

The method for cleaning the copper-exposed substrate according to claim 1, wherein the carbonated water is obtained as a result of passage through a platinum-group metal catalyst to achieve the concentration of hydrogen peroxide.

[Claim 3]

The method for cleaning the copper-exposed substrate according to claim 2, further comprising adding hydrogen before the passage through the platinum-group metal catalyst.

[Claim 4]

The method for cleaning the copper-exposed substrate according to claim 2 or 3, wherein the platinum-group metal catalyst is a palladium catalyst.

[Claim 5]

The method for cleaning the copper-exposed substrate according to claim 2 or 3, wherein the platinum-group metal catalyst is obtained as a result of supporting a palladium catalyst on a monolithic organic porous anion exchanger.

[Claim 6]

The method for cleaning the copper-exposed substrate according to claim 5, wherein, before or after water from a subsystem of an ultrapure water production device flows into a substrate treatment device for cleaning the substrate, the passage of the water through the platinum-group metal catalyst is performed.

[Claim 7]

The method for cleaning the copper-exposed substrate according to any one of claims 1 to 6, wherein a process of cleaning the substrate with the carbonated water is performed in an atmosphere having oxygen gas concentration of 2% or less.

[Claim 8]

The method for cleaning the copper-exposed substrate according to any one of claims 1 to 7, wherein a process of cleaning the substrate with the carbonated water is performed in a light shielded environment.

[Claim 9]

The method for cleaning the copper-exposed substrate according to any one of claims 1 to 3, further comprising limiting concentration of dissolved oxygen to 6 μg/L or more and 130 μg/L or less.

[Claim 10]

A system for cleaning a copper-exposed substrate comprising:

an ultrapure water production device that includes an ultraviolet oxidation device for irradiating water with ultraviolet rays;

a treatment chamber in which a substrate having at least copper or a copper compound exposed on a surface is disposed and to which a substrate treatment solution for cleaning and treating the substrate is supplied; and

means for producing, as a treatment solution for the substrate, carbonated water in which concentration of hydrogen peroxide dissolved in water is limited to 2 μg/L or less and to which carbon dioxide is added to adjust resistivity to be within a range of 0.03 to 5.0 MΩ·cm in a flow path from the ultraviolet oxidation device of the ultrapure water production device to a treatment solution discharging part of the treatment chamber.

[Claim 11]

The system for cleaning the copper-exposed substrate according to claim 10, wherein the means includes a hydrogen peroxide removal device for removing hydrogen peroxide from water, and a carbon dioxide supply device for supplying carbon dioxide to water.

[Claim 12]

The system for cleaning the copper-exposed substrate according to claim 11, wherein the hydrogen peroxide removal device is disposed on a downstream side of the ultraviolet oxidation device in the ultrapure water production device, and the carbon dioxide supply device is disposed in a flow path from a water outlet of the ultrapure water production device to the treatment chamber.

[Claim 13]

The system for cleaning the copper-exposed substrate according to claim 12, wherein a hydrogen supply device for supplying hydrogen to water is disposed between the ultraviolet oxidation device and the hydrogen peroxide removal device.

[Claim 14]

The system for cleaning the copper-exposed substrate according to claim 11, wherein the hydrogen peroxide removal device and the ultraviolet oxidation device are disposed in a flow path from a water outlet of the ultrapure water production device to the treatment chamber.

[Claim 15]

The system for cleaning the copper-exposed substrate according to claim 14, wherein a hydrogen supply device for supplying hydrogen to water is disposed upstream of the hydrogen peroxide removal device in a flow path from the water outlet of the ultrapure water production device to the treatment chamber.

[Claim 16]

The system for cleaning the copper-exposed substrate according to any one of claims 11 to 15, wherein the hydrogen peroxide removal device includes a catalyst unit filled with a platinum-group metal catalyst.

[Claim 17]

The system for cleaning the copper-exposed substrate according to claim 16, wherein the platinum-group metal catalyst is a palladium catalyst.

[Claim 18]

The system for cleaning the copper-exposed substrate according to claim 16, wherein the platinum-group metal catalyst is obtained as a result of supporting a palladium catalyst on a monolithic organic porous anion exchanger.

[Claim 19]

The system for cleaning the copper-exposed substrate according to claim 18, wherein the hydrogen peroxide removal device is installed between a water outlet of a subsystem of the ultrapure water production device and a water inlet of a substrate treatment device that includes the treatment chamber, or inside the substrate treatment device.

[Claim 20]

The system for cleaning the copper-exposed substrate according to any one of claims 10 to 19, wherein in the carbonated water supplied to the treatment chamber, concentration of dissolved oxygen is limited to 6 μg/L or more and 130 μg/L or less.