Claims

~~[Claim 1]~~

~~A treatment liquid for cleaning a semiconductor wafer, comprising:~~

~~(A) a hypochlorite ion; and~~

~~(C) a solvent, wherein~~

~~pH at 25°C is more than 7 and less than 12.0.~~

[Claim 1~~2~~]

A treatment liquid for cleaning a semiconductor wafer, comprising:

(A) a hypochlorite ion;

(B1) an alkyl ammonium ion; and

(C) a solvent, wherein

a concentration of the (A) hypochlorite ion is 0.05 mass% to 6 mass%, and pH at 25°C is more than 7 and less than 12.0.

[Claim 2]

The treatment liquid according to claim 1, wherein a concentration of the (A) hypochlorite ion is 0.1 mass% to 6 mass%.

[Claim 3]

The treatment liquid according to claim 2, wherein a concentration of the (A) hypochlorite ion is 0.3 mass% to 6 mass%.

[Claim 4~~3~~]

A treatment liquid for cleaning a semiconductor wafer, comprising:

(A) a hypochlorite ion;

(B1~~2~~) ~~at least one metal ion selected from the group consisting of~~ an alkyl ammonium ion ~~alkali metal ion and an alkaline earth metal ion~~; and

(C) a solvent, wherein

the solvent (C) contains an organic solvent~~a concentration~~

~~of the (B2) metal ion is 1 ppm or more and 20,000 ppm or less on a mass basis~~, and pH at 25°C is 8 or more ~~than 7~~ and less than 12.0.

[Claim 5~~4~~]

The treatment liquid according to ~~any one of~~ claim~~s~~ ~~1~~4 ~~to 3~~, wherein a concentration of the (A) hypochlorite ion is 0.05 mass% to 20.0 mass%.

[Claim 6~~5~~]

The treatment liquid according to claim 1~~2~~, wherein the (B1) alkyl ammonium ion is a quaternary alkyl ammonium ion.

[Claim 7~~6~~]

The treatment liquid according to claim 4~~3~~, wherein the (B1~~2~~) alkyl ammonium ion is a quaternary alkyl ammonium ~~metal ion is a sodium~~ ion.

[Claim 8~~7~~]

A method for cleaning a semiconductor wafer, wherein the treatment liquid according to ~~any one of~~ claim~~s~~ 1 ~~to 6~~ is brought into contact with the semiconductor wafer.

[Claim 9]

A method for cleaning a semiconductor wafer, wherein the treatment liquid according to claim 4 is brought into contact with the semiconductor wafer.

[Claim 10~~8~~]

The method for cleaning a semiconductor wafer according to claim 8~~7~~, wherein the semiconductor wafer has at least one metal selected from the group consisting of ruthenium and tungsten on a surface thereof, and the method includes a step of removing the metal.

[Claim 11]

The method for cleaning a semiconductor wafer according to

claim 9, wherein the semiconductor wafer has at least one metal selected from the group consisting of ruthenium and tungsten on a surface thereof, and the method includes a step of removing the metal.

[Claim 12~~9~~]

A method for manufacturing the treatment liquid according to claim 1~~2~~, comprising:

(a) ~~a step of~~ preparing an ion exchange resin to which alkyl ammonium is added; and

(b) ~~a step of~~ bringing the ion exchange resin to which the alkyl ammonium is added into contact with an aqueous solution containing a hypochlorite ion.

[Claim 13]

A method for manufacturing the treatment liquid according to claim 4, comprising:

(a) preparing an ion exchange resin to which alkyl ammonium is added; and

(b) bringing the ion exchange resin to which the alkyl ammonium is added into contact with an aqueous solution containing a hypochlorite ion.

[Claim 14~~0~~]

The method for manufacturing the treatment liquid according to claim 12~~9~~, comprising ~~:~~

~~(c) a step of~~ adjusting pH after the (b) ~~step~~.

[Claim 15]

The method for manufacturing the treatment liquid according to claim 13, comprising (c) adjusting pH after the (b).