CLAIMS

[Claim 1]

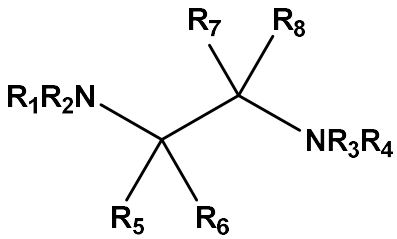
A cleaning solution for a semiconductor substrate, the cleaning solution comprising:

a compound represented by formula (A); and

a polymer having a group selected from the group consisting of a carboxy group and salts thereof and a sulfonic acid group and salts thereof,

wherein the cleaning solution has a pH of 7.5 or more:

[Chem. 1]



(A)

wherein, in formula (A),

R_1 to R_8 each independently represent a hydrogen atom or an alkyl group optionally having a substituent other than a carboxy group and a phosphonic acid group;

at least one of R_1, R_2, R_3, or R_4 represents an alkyl group optionally having a substituent other than a carboxy group, a phosphonic acid group, and an amino group;

R_3 and R_7 may be bonded together via a single bond or a divalent linking group to form a ring; and R_1 and R_3 may be

bonded together via a single bond or a divalent linking group to form a ring.

[Claim 2]

The cleaning solution for a semiconductor substrate according to claim 1, wherein R_5 and R_6 are each a hydrogen atom.

[Claim 3]

The cleaning solution for a semiconductor substrate according to claim 1 or 2, wherein R_1 to R_8 each independently represent a hydrogen atom or an alkyl group optionally having a substituent other than a carboxy group, a phosphonic acid group, and a hydroxy group, and

wherein at least one of R_1, R_2, R_3, or R_4 represents an alkyl group optionally having a substituent other than a carboxy group, a phosphonic acid group, a hydroxy group, and an amino group.

[Claim 4]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 3, wherein R_1 and R_2 are each a hydrogen atom, and wherein at least one of R_3 or R_4 is an alkyl group optionally having a substituent other than a carboxy group and a phosphonic acid group.

[Claim 5]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 4, wherein the polymer

has a weight average molecular weight of 4000 or more.

[Claim 6]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 5, wherein the cleaning solution has a pH of 10.0 or more.

[Claim 7]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 6, wherein the cleaning solution has a pH of 11.0 or more.

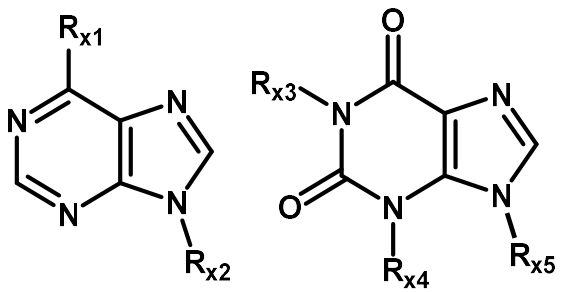
[Claim 8]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 7, wherein the cleaning solution further comprises a corrosion inhibitor.

[Claim 9]

The cleaning solution for a semiconductor substrate according to claim 8, wherein the corrosion inhibitor includes at least one of a compound represented by formula (C) or a compound represented by formula (D):

[Chem. 2]



(C) (D)

wherein, in formulas (C) and (D),

R_{x1} to R_{x5} each independently represent a hydrogen atom, an alkyl group optionally having a substituent, an amino group optionally having a substituent, a thiol group, a hydroxy group, a halogen atom, a sugar group optionally having a substituent, or a polyoxyalkylene group-containing group optionally having a substituent.

[Claim 10]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 9, wherein a ClogP value of the compound represented by formula (A) above is a negative value.

[Claim 11]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 10, wherein the number of carbon atoms in the compound represented by formula (A) above is 5 or less.

[Claim 12]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 11, wherein the cleaning solution comprises water.

[Claim 13]

The cleaning solution for a semiconductor substrate according to any one of claims 1 to 12, wherein the cleaning solution is used to clean a target object subjected to

chemical mechanical polishing processing.

[Claim 14]

The cleaning solution for a semiconductor substrate according to claim 13, wherein the target object has a copper surface and a silicon carbonitride surface that have been subjected to chemical mechanical polishing processing, and wherein the cleaning solution is used to clean the copper surface and the silicon carbonitride surface.

[Claim 15]

A method for cleaning a target object, the method comprising the step of bringing a target object having a copper surface and a silicon carbonitride surface that have been subjected to chemical mechanical polishing processing into contact with the cleaning solution for a semiconductor substrate according to any one of claims 1 to 14.

[Claim 16]

The method for cleaning a target object according to claim 15, wherein the step is cleaning with a polishing pad, buff cleaning, cleaning by an immersion method, spin cleaning, or scrub cleaning.

[Claim 17]

A method for manufacturing a semiconductor device, the method comprising the method for cleaning a target object according to claim 15 or 16.