CLAIMS

[Claim 1]

A method for cleaning a semiconductor substrate, the method comprising a step of swelling, releasing and dissolving an adhesive layer formed on a semiconductor substrate using a releasing and dissolving composition,

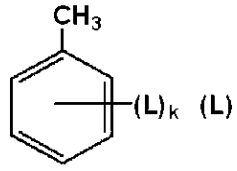
wherein the releasing and dissolving composition contains:

a component [I]: a quaternary ammonium salt;

a component [II]: an amide-based solvent; and

a component [III]: a solvent represented by the following Formula (L):

[Chem. 1]



in the formula (L), L represents a substituent substituted on a benzene ring and each independently represents an alkyl group having 1 to 4 carbon atoms, and k represents the number of L and is an integer of 0 to 5,

the content of the amide-based solvent in the releasing and dissolving composition is 10 to 40 mass% with respect to 100 mass% of aprotic solvent, which is a solvent that does not contain hydroxyl groups (-OH),

the content of the solvent represented by formula (L)

in the releasing and dissolving composition is 40 to 90 mass% with respect to 100 mass% of the aprotic solvent.

[Claim 2]

The method for cleaning a semiconductor substrate according to claim 1, wherein L is a methyl group or an isopropyl group.

[Claim 3]

The method for cleaning a semiconductor substrate according to claim 2, wherein the solvent represented by Formula (L) is at least one selected from toluene, mesitylene, p-cymene, and 1,2,4-trimethylbenzene.

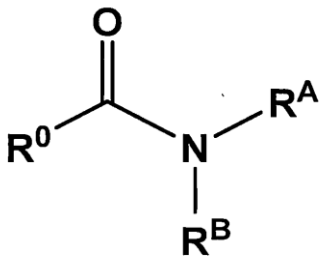
[Claim 4]

The method for cleaning a semiconductor substrate according to claim 1, wherein the quaternary ammonium salt is a halogen-containing quaternary ammonium salt.

[Claim 5]

The method for cleaning a semiconductor substrate according to claim 1, wherein the amide-based solvent is an acid amide derivative represented by the following Formula (Z) or a compound represented by the following Formula (Y):

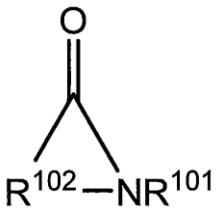
[Chem. 2]



(Z)

in the formula (Z), R^0 represents an ethyl group, a propyl group, or an isopropyl group, and R^A and R^B each independently represent an alkyl group having 1 to 4 carbon atoms,

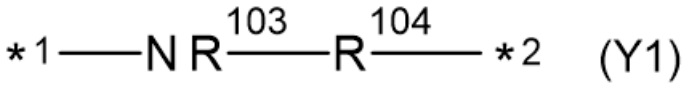
[Chem. 3]



(Y)

in the formula (Y), R^{101} represents an alkyl group having 1 to 6 carbon atoms, and R^{102} represents an alkylene group having 1 to 6 carbon atoms or a group represented by the following Formula (Y1),

[Chem. 4]



(Y1)

in the formula (Y1), R^{103} represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms, R^{104} represents an alkylene group having 1 to 5 carbon atoms, *1 represents

a bond bonded to a carbon atom in Formula (Y), and *2 represents a bond bonded to a nitrogen atom in Formula (Y).

[Claim 6]

The method for cleaning a semiconductor substrate according to claim 1, wherein the adhesive layer is a film obtained using an adhesive composition containing an adhesive component (S) containing at least one selected from a siloxane-based adhesive, an acrylic resin-based adhesive, an epoxy resin-based adhesive, a polyamide-based adhesive, a polystyrene-based adhesive, a polyimide adhesive, and a phenolic resin-based adhesive.

[Claim 7]

The method for cleaning a semiconductor substrate according to claim 6, wherein the adhesive component (S) contains a siloxane-based adhesive.

[Claim 8]

The method for cleaning a semiconductor substrate according to claim 7, wherein the siloxane-based adhesive contains a polyorganosiloxane component (A') which is cured by a hydrosilylation reaction.

[Claim 9]

The method for cleaning a semiconductor substrate according to claim 1, wherein the swelling, releasing and dissolving step includes a step of eliminating the released adhesive layer.

[Claim 10]

A method for manufacturing a processed semiconductor substrate, the method comprising:

a first step of manufacturing a laminate including a semiconductor substrate, a support substrate, and an adhesive layer obtained using an adhesive composition;

a second step of processing the semiconductor substrate of the obtained laminate;

a third step of separating the semiconductor substrate and the adhesive layer from the support substrate; and

a fourth step of swelling, releasing and dissolving the adhesive layer formed on the semiconductor substrate using a releasing and dissolving composition to remove the adhesive layer,

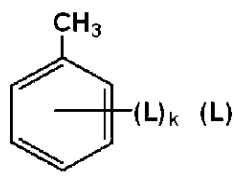
wherein the releasing and dissolving composition contains:

a component [I]: a quaternary ammonium salt;

a component [II]: an amide-based solvent; and

a component [III]: a solvent represented by the following Formula (L):

[Chem. 5]



in the formula (L), L represents a substituent substituted on a benzene ring and each independently represents an alkyl group having 1 to 4 carbon atoms, and k represents the number of L and is an integer of 0 to 5,

the content of the amide-based solvent in the releasing and dissolving composition is 10 to 40 mass% with respect to 100 mass% of aprotic solvent, which is a solvent that does not contain hydroxyl groups (-OH),

the content of the solvent represented by formula (L) in the releasing and dissolving composition is 40 to 90 mass% with respect to 100 mass% of the aprotic solvent.

[Claim 11]

The method for manufacturing a processed semiconductor substrate according to claim 10, wherein L is a methyl group or an isopropyl group.

[Claim 12]

The method for manufacturing a processed semiconductor substrate according to claim 11, wherein the solvent represented by Formula (L) is at least one selected from toluene, mesitylene, p-cymene, and 1,2,4-trimethylbenzene.

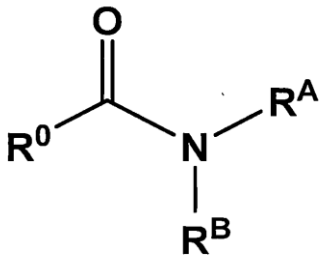
[Claim 13]

The method for manufacturing a processed semiconductor substrate according to claim 10, wherein the quaternary ammonium salt is a halogen-containing quaternary ammonium salt.

[Claim 14]

The method for manufacturing a processed semiconductor substrate according to claim 10, wherein the amide-based solvent is an acid amide derivative represented by the following Formula (Z) or a compound represented by the following Formula (Y):

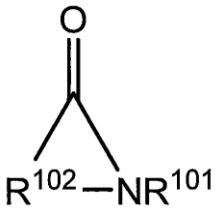
[Chem. 6]



(Z)

in the formula (Z), R^0 represents an ethyl group, a propyl group, or an isopropyl group, and R^A and R^B each independently represent an alkyl group having 1 to 4 carbon atoms,

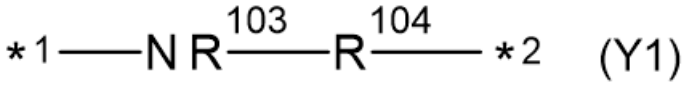
[Chem. 7]



(Y)

in the formula (Y), R^{101} represents an alkyl group having 1 to 6 carbon atoms, and R^{102} represents an alkylene group having 1 to 6 carbon atoms or a group represented by the following Formula (Y1),

[Chem. 8]



(Y1)

in the formula (Y1), R^{103} represents a hydrogen atom or an alkyl group having 1 to 6 carbon atoms, R^{104} represents an alkylene group having 1 to 5 carbon atoms, *1 represents a bond bonded to a carbon atom in Formula (Y), and *2 represents a bond bonded to a nitrogen atom in Formula (Y).

[Claim 15]

The method for manufacturing a processed semiconductor substrate according to claim 10, wherein the adhesive layer is a film obtained using an adhesive composition containing an adhesive component (S) containing at least one selected from a siloxane-based adhesive, an acrylic resin-based adhesive, an epoxy resin-based adhesive, a polyamide-based adhesive, a polystyrene-based adhesive, a polyimide adhesive, and a phenolic resin-based adhesive.

[Claim 16]

The method for manufacturing a processed semiconductor substrate according to claim 15, wherein the adhesive component (S) contains a siloxane-based adhesive.

[Claim 17]

The method for manufacturing a processed semiconductor substrate according to claim 16, wherein the siloxane-based

adhesive contains a polyorganosiloxane component (A') which is cured by a hydrosilylation reaction.

[Claim 18]

The method for manufacturing a processed semiconductor substrate according to claim 10, wherein the fourth step of swelling, releasing and dissolving the adhesive layer to remove the adhesive layer includes a step of eliminating the released adhesive layer.