Claims

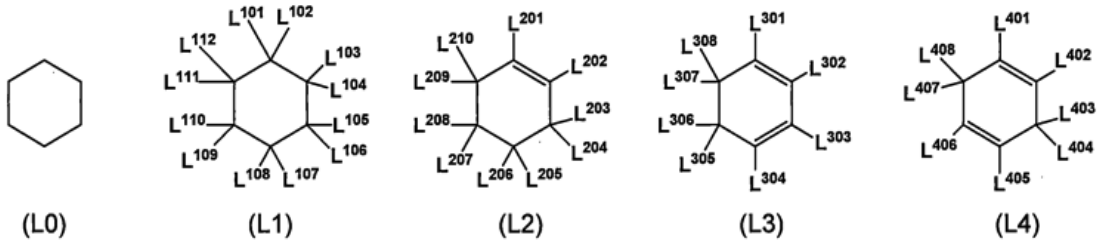
1. A semiconductor substrate cleaning method comprising a step of removing an adhesive layer provided on a semiconductor substrate by use of a remover composition, wherein

the adhesive layer is a film formed from an adhesive composition comprising an adhesive component (S) containing a siloxane adhesive which comprises a polyorganosiloxane component (A) being curable through hydrosilylation;

the remover composition contains a solvent but no salt; and

the solvent includes an organic solvent represented by any of formulae (L0) to (L4):

[F1]



(wherein each of L^{101} to L^{112} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{101} to L^{112} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{201} to L^{210} independently represents a hydrogen atom, a C1 to C5 alkyl

group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{201} to L^{210} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{301} to L^{308} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{301} to L^{308} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; and each of L^{401} to L^{408} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{401} to L^{408} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group) in an amount of 80 mass% or more.

2. A semiconductor substrate cleaning method according to claim 1, wherein the solvent includes an organic solvent represented by any of formulae (L0) to (L4) in an amount of 85 mass% or more.

3. A semiconductor substrate cleaning method according to claim 2, wherein the solvent is formed of an organic solvent represented by any of formulae (L0) to (L4).

4. A semiconductor substrate cleaning method according to any one of claims 1 to 3, wherein

the C1 to C5 alkyl group is a methyl group, an ethyl group, an n-propyl group, or an isopropyl group;

the C2 to C5 alkenyl group is an ethenyl group, a 1-methylethenyl group, or a 2-methylethenyl group; and

the C2 to C5 alkynyl group is an ethynyl group or a 2-

methylethynyl group.

5. A semiconductor substrate cleaning method according to claim 4, wherein

one or two of the groups L^{101} to L^{112} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{201} to L^{210} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{301} to L^{308} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom; and

one or two of the groups L^{401} to L^{408} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom.

6. A semiconductor substrate cleaning method according to any one of claims 1 to 5, wherein the adhesive component (S) further comprises at least one species selected from among an acrylic resin adhesive, an epoxy resin adhesive, a polyamide adhesive, a polystyrene adhesive, a polyimide adhesive, and a phenolic resin adhesive.

7. A processed semiconductor substrate production method comprising:

a first step of producing a laminate having a semiconductor substrate, a support substrate, and an adhesive layer formed from an adhesive composition,

wherein the adhesive layer is a film formed from an adhesive composition comprising an adhesive component (S) containing a siloxane adhesive which comprises a polyorganosiloxane component (A) being curable through hydrosilylation;

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

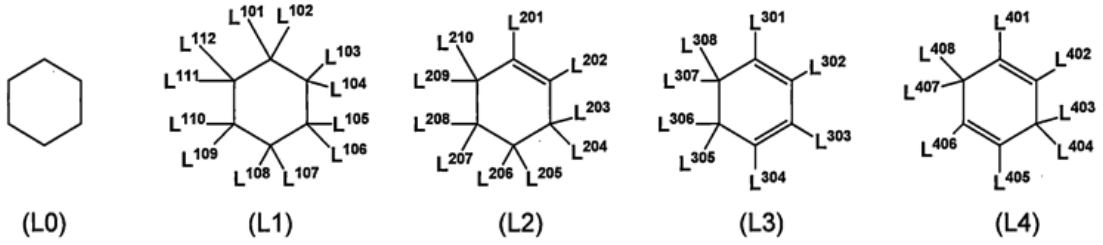
a third step of separating the semiconductor substrate and the adhesive layer from the support substrate; and

a fourth step of removing the adhesive layer on the semiconductor substrate by use of a remover composition, wherein

the remover composition contains a solvent but no salt; and

the solvent includes an organic solvent represented by any of formulae (L0) to (L4):

[F2]



(wherein each of L^{101} to L^{112} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{101}

to L^{112} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{201} to L^{210} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{201} to L^{210} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{301} to L^{308} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{301} to L^{308} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; and each of L^{401} to L^{408} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{401} to L^{408} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group) in an amount of 80 mass% or more.

8. A processed semiconductor substrate production method according to claim 7, wherein the solvent includes the organic solvent represented by any of formulae (L0) to (L4) in an amount of 85 mass% or more.

9. A processed semiconductor substrate production method according to claim 8, wherein the solvent is formed of the organic solvent represented by any of formulae (L0) to (L4).

10. A processed semiconductor substrate production method according any one of claims 7 to 9, wherein

the C1 to C5 alkyl group is a methyl group, an ethyl group, an n-propyl group, or an isopropyl group;

the C2 to C5 alkenyl group is an ethenyl group, a 1-methylethenyl group, or a 2-methylethenyl group; and

the C2 to C5 alkynyl group is an ethynyl group or a 2-methylethynyl group.

11. A processed semiconductor substrate production method according to claim 10, wherein

one or two of the groups L^{101} to L^{112} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{201} to L^{210} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{301} to L^{308} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom; and

one or two of the groups L^{401} to L^{408} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom.

12. A processed semiconductor substrate production method according to any one of claims 7 to 11, wherein adhesive component (S) further comprises at least one species selected from among an acrylic resin adhesive, an epoxy resin

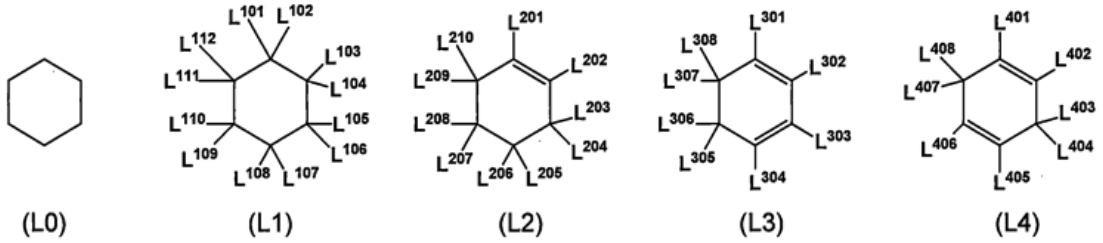
adhesive, a polyamide adhesive, a polystyrene adhesive, a polyimide adhesive, and a phenolic resin adhesive.

13. A remover composition configured to remove an adhesive layer provided on a semiconductor substrate during cleaning the semiconductor substrate, wherein the adhesive layer is a film formed from an adhesive composition comprising an adhesive component (S) containing a siloxane adhesive which comprises a polyorganosiloxane component (A) being curable through hydrosilylation, wherein

the remover composition contains a solvent but no salt, and

the solvent includes an organic solvent represented by any of formulae (L0) to (L4):

[F3]



(wherein each of L^{101} to L^{112} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{101} to L^{112} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{201} to L^{210} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group,

and at least one of L^{201} to L^{210} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; each of L^{301} to L^{308} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{301} to L^{308} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group; and each of L^{401} to L^{408} independently represents a hydrogen atom, a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and at least one of L^{401} to L^{408} represents a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group) in an amount of 80 mass% or more.

14. A remover composition according to claim 13, wherein the solvent includes the organic solvent represented by any of formulae (L0) to (L4) in an amount of 85 mass% or more.

15. A remover composition according to claim 14, wherein the solvent is formed of the organic solvent represented by any of formulae (L0) to (L4).

16. A remover composition according any one of claims 13 to 15, wherein

the C1 to C5 alkyl group is a methyl group, an ethyl group, an n-propyl group, or an isopropyl group;

the C2 to C5 alkenyl group is an ethenyl group, a 1-methylethenyl group, or a 2-methylethenyl group; and

the C2 to C5 alkynyl group is an ethynyl group or a 2-methylethynyl group.

17. A remover composition according to claim 16, wherein

one or two of the groups L^{101} to L^{112} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{201} to L^{210} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom;

one or two of the groups L^{301} to L^{308} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom; and

one or two of the groups L^{401} to L^{408} are a C1 to C5 alkyl group, a C2 to C5 alkenyl group, or a C2 to C5 alkynyl group, and each of the remaining groups is a hydrogen atom.

18. A remover composition according to any one of claims 13 to 17, wherein the adhesive component (S) further comprises at least one species selected from among an acrylic resin adhesive, an epoxy resin adhesive, a polyamide adhesive, a polystyrene adhesive, a polyimide adhesive, and a phenolic resin adhesive.