Claims

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

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

the remover composition contains a solvent but no salt; and

the solvent includes an organic solvent represented by formula (L):

[F1]



(L)

(wherein each of L^1 and L^2 represents a C2 to C5 alkyl group, and L^3 represents O or S) in an amount of 80 mass% or more.

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

3. A semiconductor substrate cleaning method according to claim 2, wherein the solvent is formed of the organic solvent represented by formula (L).

4. A semiconductor substrate cleaning method according to any one of claims 1 to 3, wherein L^1 and L^2 are the same group.

5. A semiconductor substrate cleaning method according to claim 4, wherein the C2 to C5 alkyl group is an ethyl group, an n-propyl group, or an n-butyl group.

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 semiconductor substrate cleaning method according to any one of claims 1 to 6, wherein the polyorganosiloxane component (A) comprises a polysiloxane (A1) having one or more units selected from the group consisting of a siloxane unit represented by SiO_2 (unit Q), a siloxane unit represented by $R^1R^2R^3SiO_{1/2}$ (unit M), a siloxane unit represented by $R^4R^5SiO_{2/2}$ (unit D), and a siloxane unit represented by $R^6SiO_{3/2}$ (unit T), and a platinum group metal catalyst (A2), and each of R^1 to R^6 is a group or an atom bonded to a silicon atom and represents an alkyl group, an alkenyl group, or a hydrogen atom.

8. A semiconductor substrate cleaning method according to claim 7, wherein the polysiloxane (A1) comprises:

a polyorganosiloxane (a1) having one or more units selected from the group consisting of a siloxane unit

represented by SiO_2 (unit Q'), a siloxane unit represented by $R^1'R^2'R^3'SiO_{1/2}$ (unit M'), a siloxane unit represented by $R^4'R^5'SiO_{2/2}$ (unit D'), and a siloxane unit represented by $R^6'SiO_{3/2}$ (unit T'), and at least one unit selected from the group consisting of unit M', unit D', and unit T'; and

a polyorganosiloxane (a2) having one or more units selected from the group consisting of and a siloxane unit represented by SiO_2 (unit Q''), a siloxane unit represented by $R^1''R^2''R^3''SiO_{1/2}$ (unit M''), a siloxane unit represented by $R^4''R^5''SiO_{2/2}$ (unit D''), and a siloxane unit represented by $R^6''SiO_{3/2}$ (unit T''), and at least one unit selected from the group consisting of unit M'', unit D'', and unit T'', and

each of R^1' to R^6' is a group bonded to a silicon atom and represents an alkyl group or an alkenyl group, and at least one of R^1' to R^6' is an alkenyl group, and

each of R^1'' to R^6'' is a group or an atom bonded to a silicon atom and represents an alkyl group or a hydrogen atom, and at least one of R^1'' to R^6'' is a hydrogen atom.

9. A processed semiconductor substrate production method comprising:

a first step of producing a laminate comprising a semiconductor substrate having metallic conductive materials, a support substrate, and an adhesive layer formed from an adhesive composition;

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

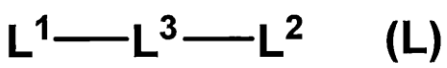
a fourth step of removing the adhesive layer on the semiconductor substrate by use of a remover composition, wherein

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

the remover composition contains a solvent but no salt; and

the solvent includes an organic solvent represented by formula (L):

[F2]



(L)

(wherein each of L^1 and L^2 represents a C2 to C5 alkyl group, and L^3 represents O or S) in an amount of 80 mass% or more.

10. A processed semiconductor substrate production method according to claim 9, wherein the solvent includes the organic solvent represented by formula (L) in an amount of 85 mass% or more.

11. A processed semiconductor substrate production method according to claim 10, wherein the solvent is formed of the organic solvent represented by formula (L).

12. A processed semiconductor substrate production

method according to any one of claims 9 to 11, wherein L^1 and L^2 are the same group.

13. A processed semiconductor substrate production method according to claim 12, wherein the C2 to C5 alkyl group is an ethyl group, an n-propyl group, or an n-butyl group.

14. A processed semiconductor substrate production method according to any one of claims 9 to 13, 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.

15. A processed semiconductor substrate production method according to any one of claims 9 to 14, wherein the polyorganosiloxane component (A) comprises a polysiloxane (A1) having one or more units selected from the group consisting of a siloxane unit represented by SiO_2 (unit Q), a siloxane unit represented by $R^1R^2R^3SiO_{1/2}$ (unit M), a siloxane unit represented by $R^4R^5SiO_{2/2}$ (unit D), and a siloxane unit represented by $R^6SiO_{3/2}$ (unit T), and each of R^1 to R^6 is a group or an atom bonded to a silicon atom and represents an alkyl group, an alkenyl group, or a hydrogen atom.

16. A processed semiconductor substrate production method according to claim 15, wherein the polysiloxane (A1) comprises:

a polyorganosiloxane (a1) having one or more units selected from the group consisting of a siloxane unit

represented by SiO_2 (unit Q'), a siloxane unit represented by $R^1'R^2'R^3'SiO_{1/2}$ (unit M'), a siloxane unit represented by $R^4'R^5'SiO_{2/2}$ (unit D'), and a siloxane unit represented by $R^6'SiO_{3/2}$ (unit T'), and at least one unit selected from the group consisting of unit M', unit D', and unit T'; and

a polyorganosiloxane (a2) having one or more units selected from the group consisting of and a siloxane unit represented by SiO_2 (unit Q''), a siloxane unit represented by $R^1''R^2''R^3''SiO_{1/2}$ (unit M''), a siloxane unit represented by $R^4''R^5''SiO_{2/2}$ (unit D''), and a siloxane unit represented by $R^6''SiO_{3/2}$ (unit T''), and at least one unit selected from the group consisting of unit M'', unit D'', and unit T'', and

each of R^1' to R^6' is a group bonded to a silicon atom and represents an alkyl group or an alkenyl group, and at least one of R^1' to R^6' is an alkenyl group, and a platinum group metal catalyst (A2), and

each of R^1'' to R^6'' is a group or an atom bonded to a silicon atom and represents an alkyl group or a hydrogen atom, and at least one of R^1'' to R^6'' is a hydrogen atom.

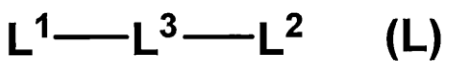
17. A remover composition for use in removal of an adhesive layer provided on a semiconductor substrate during cleaning the semiconductor substrate having metallic conductive materials, which composition contains a solvent but no salt, wherein

the adhesive layer is a film formed from an adhesive composition which contains an adhesive component (S), and the adhesive component (S) comprises a siloxane adhesive

containing a polyorganosiloxane component (A) which is curable through hydrosilylation; and

the solvent includes an organic solvent represented by formula (L):

[F3]



(L)

(wherein each of L^1 and L^2 represents a C2 to C5 alkyl group, and L^3 represents O or S) in an amount of 80 mass% or more.

18. A remover composition according to claim 17, wherein the solvent includes the organic solvent represented by formula (L) in an amount of 85 mass% or more.

19. A remover composition according to claim 18, wherein the solvent is formed of the organic solvent represented by formula (L).

20. A remover composition according to any one of claims 17 to 19, wherein L^1 and L^2 are the same group.

21. A remover composition according to claim 20, wherein the C2 to C5 alkyl group is an ethyl group, an n-propyl group, or an n-butyl group.

22. A remover composition according to any one of claims 17 to 21, 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.

23. A remover composition according to any one of claims 19 to 22, wherein the polyorganosiloxane component (A) comprises a polysiloxane (A1) having one or more units selected from the group consisting of a siloxane unit represented by SiO_2 (unit Q), a siloxane unit represented by $R^1R^2R^3SiO_{1/2}$ (unit M), a siloxane unit represented by $R^4R^5SiO_{2/2}$ (unit D), and a siloxane unit represented by $R^6SiO_{3/2}$ (unit T), and a platinum group metal catalyst (A2); and each of R^1 to R^6 is a group or an atom bonded to a silicon atom and represents an alkyl group, an alkenyl group, or a hydrogen atom.

24. A remover composition according to claim 23, wherein the polysiloxane (A1) comprises:

a polyorganosiloxane (a1) having one or more units selected from the group consisting of a siloxane unit represented by SiO_2 (unit Q'), a siloxane unit represented by $R^1'R^2'R^3'SiO_{1/2}$ (unit M'), a siloxane unit represented by $R^4'R^5'SiO_{2/2}$ (unit D'), and a siloxane unit represented by $R^6'SiO_{3/2}$ (unit T'), and at least one unit selected from the group consisting of unit M', unit D', and unit T'; and

a polyorganosiloxane (a2) having one or more units selected from the group consisting of and a siloxane unit represented by SiO_2 (unit Q''), a siloxane unit represented by $R^1''R^2''R^3''SiO_{1/2}$ (unit M''), a siloxane unit represented by $R^4''R^5''SiO_{2/2}$ (unit D''), and a siloxane unit represented by $R^6''SiO_{3/2}$ (unit T''), and at least one unit selected from the group consisting of unit M'', unit D'', and unit T'', and

each of $R^{1'}$ to $R^{6'}$ is a group bonded to a silicon atom and represents an alkyl group or an alkenyl group, and at least one of $R^{1'}$ to $R^{6'}$ is an alkenyl group, and a platinum group metal catalyst (A2), and

each of $R^{1''}$ to $R^{6''}$ is a group or an atom bonded to a silicon atom and represents an alkyl group or a hydrogen atom, and at least one of $R^{1''}$ to $R^{6''}$ is a hydrogen atom.