[CLAIMS]

[Claim 1]

A resin composition which is used as a material of an insulating layer of a printed wiring board including the insulating layer, and a conductor layer formed by plating on a surface of the insulating layer, comprising an epoxy compound (A), a cyanate ester compound (B) and an inorganic filler (C), wherein the cyanate ester compound (B) is at least one selected from the group consisting of a naphthol aralkyl type cyanate ester compound, an aromatic hydrocarbon formaldehyde type cyanate ester compound, a biphenyl aralkyl type cyanate ester compound and a novolak type cyanate ester compound, and the content of the epoxy compound (A) is 60 to 75% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

[Claim 2]

The resin composition according to claim 1, wherein the cyanate ester compound (B) is at least one selected from the group consisting of a naphthol aralkyl type cyanate ester compound, an aromatic hydrocarbon formaldehyde type cyanate ester compound and a biphenyl aralkyl type cyanate ester compound.

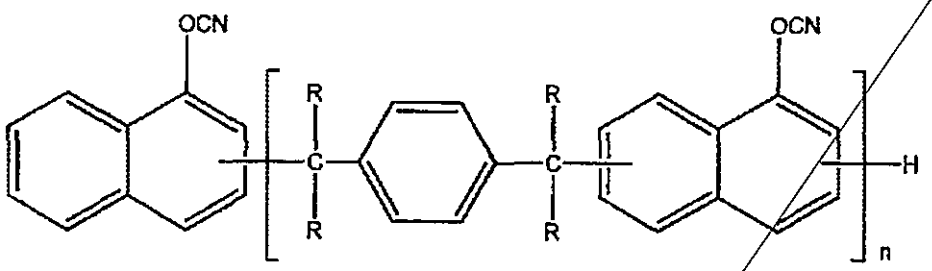
[Claim 3]

The resin composition according to claim 1 or 2, wherein the content of the epoxy compound (A) is 65 to 75% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

[Claim 4]

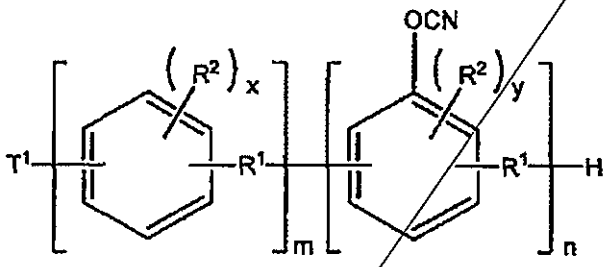
The resin composition according to any one of claims 1 to 3, wherein the naphthol aralkyl type cyanate ester compound is represented by formula (1), the aromatic hydrocarbon formaldehyde type cyanate ester compound is represented by formula (2), the biphenyl aralkyl type

cyanate ester compound is represented by formula (3), and the novolak type cyanate ester compound is represented by formula (4):



(1)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more;



(2)

wherein

each R^1 independently represents a methylene group, a methyleneoxy group, a methyleneoxymethylene group or an oxymethylene group,

each R^2 independently represents a C1-3 alkyl group, a hydroxyl group or a hydroxymethylene group,

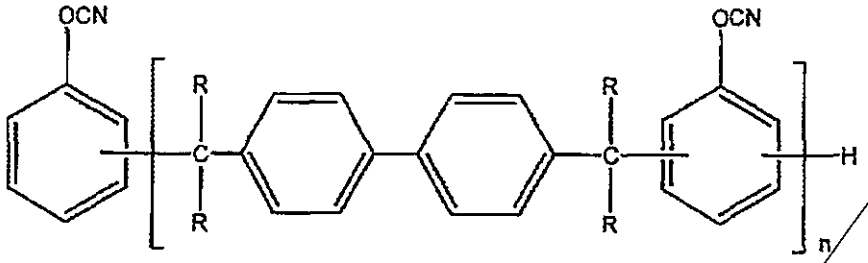
T^1 represents a hydrogen atom, a hydroxyl group or a hydroxymethylene group,

each x independently represents an integer of 0 to 4,

y each independently represents an integer of 0 to 3,

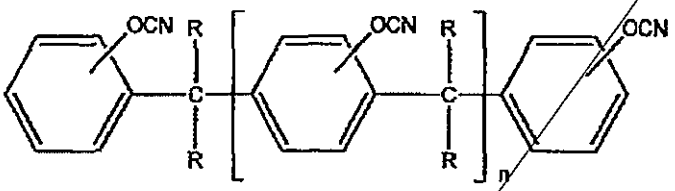
m represents an integer of 0 or more, and

n represents an integer of one or more;



(3)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more; and



(4)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more.

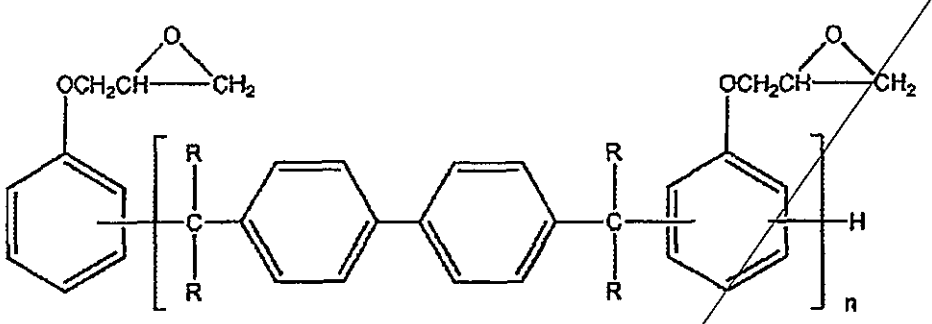
[Claim 5]

The resin composition according to any one of claims 1 to 4, wherein the epoxy compound (A) is at least one selected from the group consisting of a biphenyl aralkyl type epoxy compound, a naphthalene type epoxy compound, a bisnaphthalene type epoxy compound, an anthraquinone type epoxy compound, a naphthol aralkyl type epoxy compound and a xylock type epoxy compound.

[Claim 6]

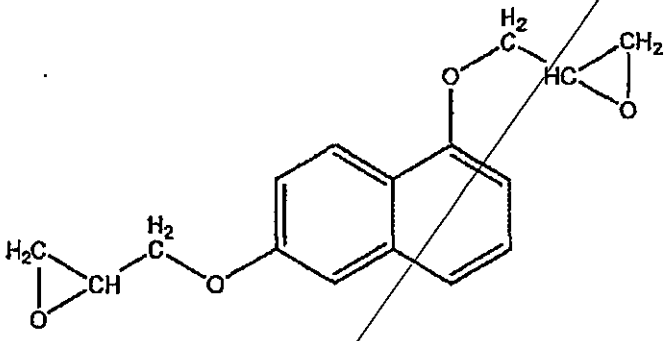
The resin composition according to claim 5, wherein the biphenyl aralkyl type epoxy compound is represented by formula (5), the naphthalene type epoxy compound is represented by formula (6), the bisnaphthalene type epoxy compound is represented by formula (7), the anthraquinone type epoxy compound is represented by formula (9), the

naphthol aralkyl type epoxy compound is represented by formula (10), and the xylock type epoxy compound is represented by formula (11):

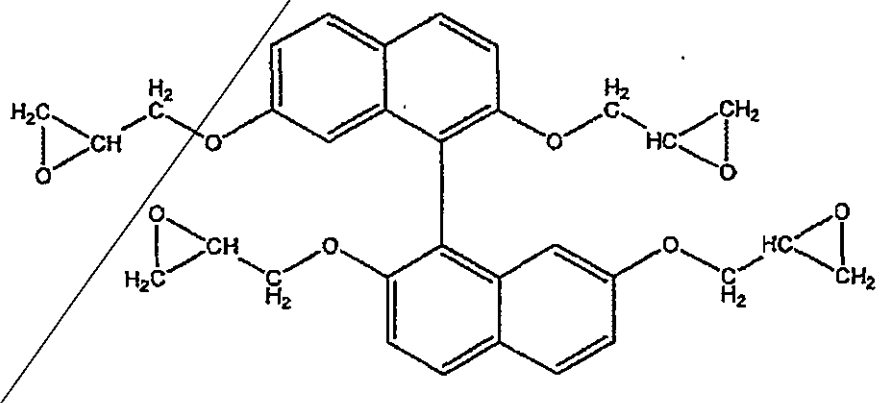


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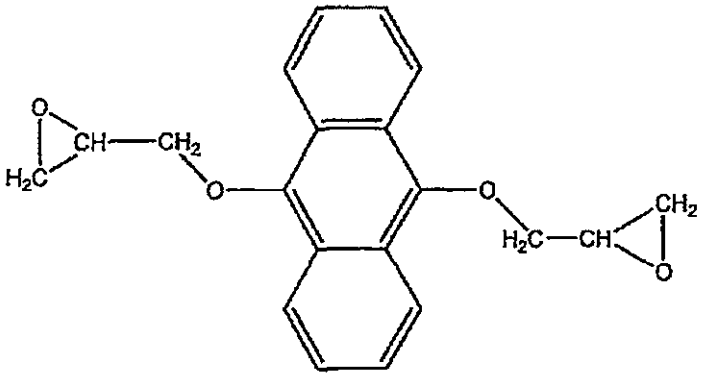
wherein n represents an integer of one or more:



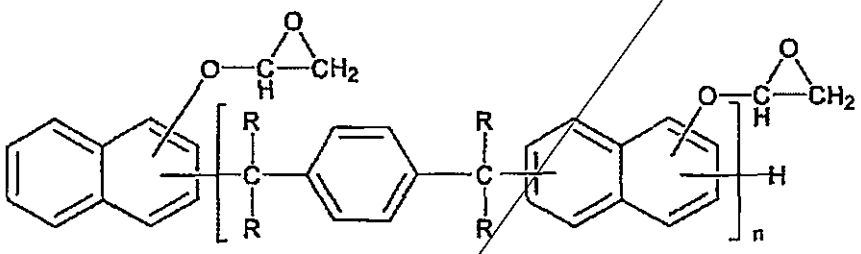
(6)



(7)

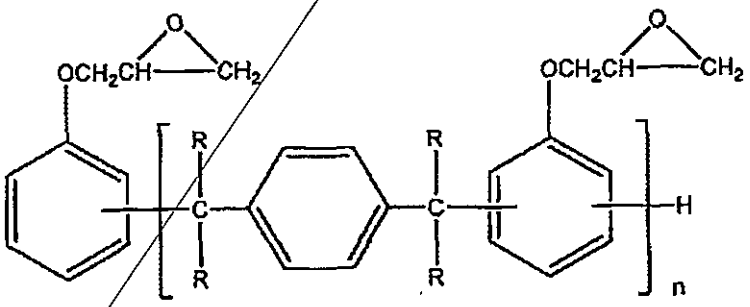


(9)



(10)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more; and



(11)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more.

[Claim 7]

The resin composition according to any one of claims 1 to 6, wherein the inorganic filler (C) is at least one

selected from the group consisting of silica, aluminum hydroxide, boehmite, magnesium oxide and magnesium hydroxide.

[Claim 8]

The resin composition according to any one of claims 1 to 7, wherein the content of the inorganic filler (C) is 50 to 250% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

[Claim 9]

The resin composition according to any one of claims 1 to 8, further comprising a bismaleimide (D).

[Claim 10]

The resin composition according to claim 9, wherein the content of the bismaleimide (D) is 5 to 20% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

[Claim 11]

A prepreg comprising a base material, and the resin composition according to any one of claims 1 to 10 attached to the base material.

[Claim 12]

A resin sheet comprising an external layer made of a metal foil or a metal film, and a layer of the resin composition according to any one of claims 1 to 10 laminated on the external layer.

[Claim 13]

A metal foil-clad laminate comprising the prepreg according to claim 11, and a metal foil laminated on one or both surface(s) of the prepreg.

[Claim 14]

The metal foil clad laminate according to claim 13, wherein surface roughness Rz of a matte surface of the metal foil is 1.0 μm to 2.5 μm.

[Claim 15]

A printed wiring board produced by using the prepreg according to claim 11 as a build-up material.

[Claim 16]

A printed wiring board produced by using the resin sheet according to claim 12 as a build-up material.

[Claim 17]

The printed wiring board according to claim 16, which is produced by subjecting the resin sheet to a surface treatment, followed by plating to form a pattern.

[Claim 18]

A printed wiring board produced by using the metal foil clad laminate according to claim 13 as a build-up material.

[Claim 19]

The printed wiring board according to claim 18, which is produced by etching the metal foil of the metal foil clad laminate, followed by subjecting it to a surface treatment and further plating to form a pattern.

[Claim 20]

A printed wiring board comprising an insulating layer, and a conductor layer formed on a surface of the insulating layer, wherein the insulating layer contains the resin composition according to any one of claims 1 to 10.

CLAIMS

1. A resin composition which is used as a material of an insulating layer of a printed wiring board including the insulating layer, and a conductor layer formed by plating on a surface of the insulating layer, comprising

an epoxy compound (A),

a cyanate ester compound (B) and

an inorganic filler (C),

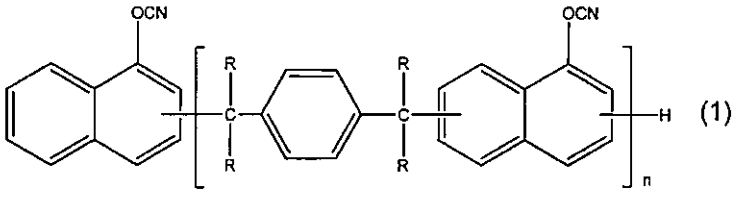
wherein the epoxy compound (A) is at least one selected from the group consisting of a biphenyl aralkyl type epoxy compound, a naphthalene type epoxy compound, a bisnaphthalene type epoxy compound, an anthraquinone type epoxy compound, a naphthol aralkyl type epoxy compound and a xylock type epoxy compound;

wherein the cyanate ester compound (B) is at least one selected from the group consisting of a naphthol aralkyl type cyanate ester compound, an aromatic hydrocarbon formaldehyde type cyanate ester compound, and a biphenyl aralkyl type cyanate ester compound cyanate ester compound, and

wherein the content of the epoxy compound (A) is 60 to 75% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

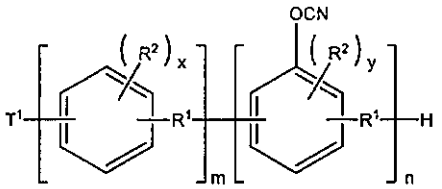
2. The resin composition according to claim 1, wherein the content of the epoxy compound (A) is 65 to 75% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

3. The resin composition according to claim 1, wherein the naphthol aralkyl type cyanate ester compound is represented by formula (1), the aromatic hydrocarbon formaldehyde type cyanate ester compound is represented by formula (2), and the biphenyl aralkyl type cyanate ester compound is represented by formula (3),



(1)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more;



(2)

wherein

each R^1 independently represents a methylene group, a methyleneoxy group, a methyleneoxymethylene group or an oxymethylene group,

each R^2 independently represents a C1-3 alkyl group, a hydroxyl group or a hydroxymethylene group,

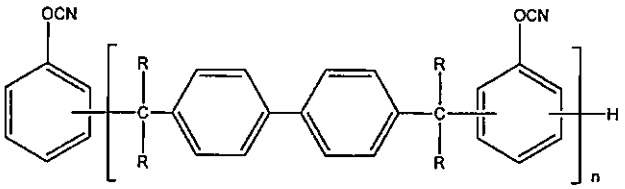
T^1 represents a hydrogen atom, a hydroxyl group or a hydroxymethylene group,

each x independently represents an integer of 0 to 4,

y each independently represents an integer of 0 to 3,

m represents an integer of 0 or more, and

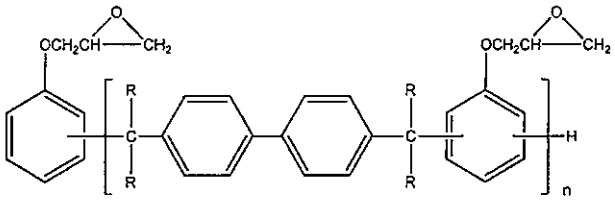
n represents an integer of one or more;



(3)

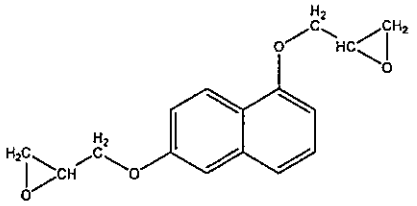
wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more.

4. The resin composition according to claim 1, wherein the biphenyl aralkyl type epoxy compound is represented by formula (5), the naphthalene type epoxy compound is represented by formula (6), the bisnaphthalene type epoxy compound is represented by formula (7), the anthraquinone type epoxy compound is represented by formula (9), the naphthol aralkyl type epoxy compound is represented by formula (10), and the xylock type epoxy compound is represented by formula (11):

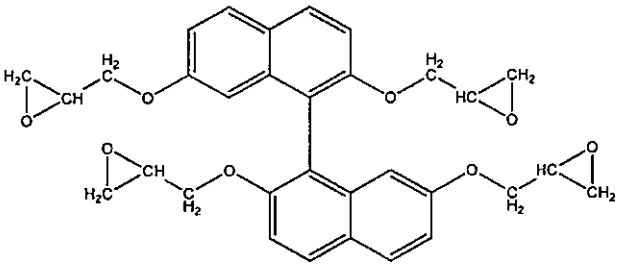


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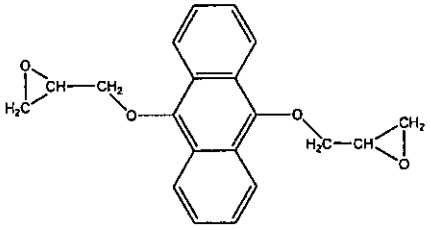
wherein n represents an integer of one or more:



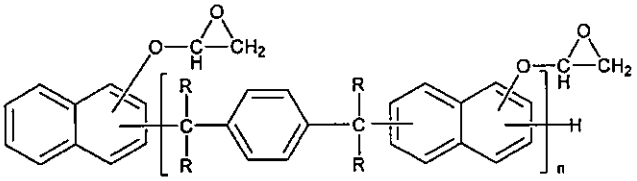
(6)



(7)

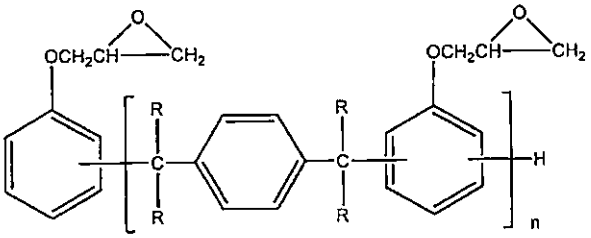


(9)



(10)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more; and



(11)

wherein each R independently represents a hydrogen atom or a methyl group, and n represents an integer of one or more.

5. The resin composition according to claim 1, wherein the inorganic filler (C) is at least one selected from the group consisting of silica, aluminum hydroxide, boehmite, magnesium oxide and magnesium hydroxide.

6. The resin composition according to claim 1, wherein the content of the inorganic filler (C) is 50 to 250% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

7. The resin composition according to claim 1, further comprising a bismaleimide (D).

8. The resin composition according to claim 7, wherein the content of the bismaleimide (D) is 5 to 20% by weight based on the total amount of the epoxy compound (A) and the cyanate ester compound (B).

9. A prepreg comprising a base material, and the resin composition according to claim 1 attached to the base material.

10. A resin sheet comprising an external layer made of a metal foil or a metal film, and a layer of the resin composition according to claim 1 laminated on the external layer.

11. A metal foil-clad laminate comprising the prepreg according to claim 9, and a metal foil laminated on one or both surface(s) of the prepreg.

12. The metal foil clad laminate according to claim 11, wherein surface roughness Rz of a matte surface of the metal foil is 1.0 μm to 2.5 μm.

13. A printed wiring board produced by using the prepreg according to claim 9 as a build-up material.

14. A printed wiring board produced by using the resin sheet according to claim 10 as a build-up material.

15. The printed wiring board according to claim 14, which is produced by subjecting the resin sheet to a surface treatment, followed by plating to form a pattern.

16. A printed wiring board produced by using the metal foil clad laminate according to claim 11 as a build-up material.

17. The printed wiring board according to claim 16, which is produced by etching the metal foil of the metal foil clad laminate, followed by subjecting it to a surface treatment and further plating to form a pattern.

18. A printed wiring board comprising an insulating layer, and a conductor layer formed on a surface of the insulating layer, wherein the insulating layer contains the resin composition according to claim 1.