CLAIMS

1. An epoxy resin composition for semiconductor encapsulation, comprising:

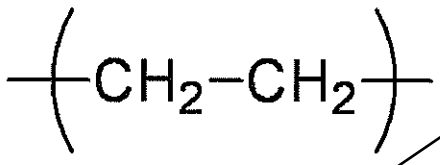
(A) an epoxy resin;

(B) a curing agent;

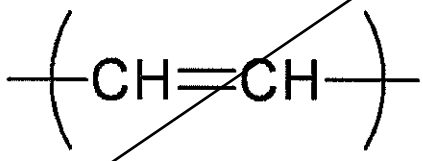
(C) an inorganic filler material;

(D) a hydrocarbon compound having structures of formula (1) and formula (2); and

(E) a hydrocarbon compound having an ester group:



(1)



(2)

2. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is an alkene.

3. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is an alkene having 10 or more carbon atoms.

4. The epoxy resin composition for semiconductor

encapsulation according to claim 1,

wherein the component (D) is a 1-alkene having 10 or more carbon atoms.

5. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is a 1-alkene having 20 or more carbon atoms.

6. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (E) is at least one hydrocarbon compound selected from the group consisting of a compound obtained by semi-esterifying a copolymer of a 1-alkene and maleic anhydride with an aliphatic alcohol, and a montanic acid ester.

7. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (E) is a compound obtained by semi-esterifying a copolymer of a 1-alkene having 5 to 60 carbon atoms and maleic anhydride with a long-chain aliphatic alcohol having 10 to 25 carbon atoms.

8. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (E) is a compound obtained by

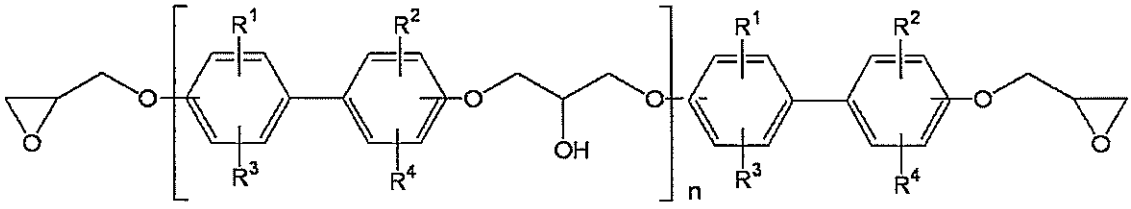
semi-esterifying a copolymer of a 1-alkene having 28 to 60 carbon atoms and maleic anhydride with a long-chain aliphatic alcohol having 15 to 20 carbon atoms.

9. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the mixing ratio of the component (D) and the component (E) is 1:4 to 1:20 as a mass ratio.

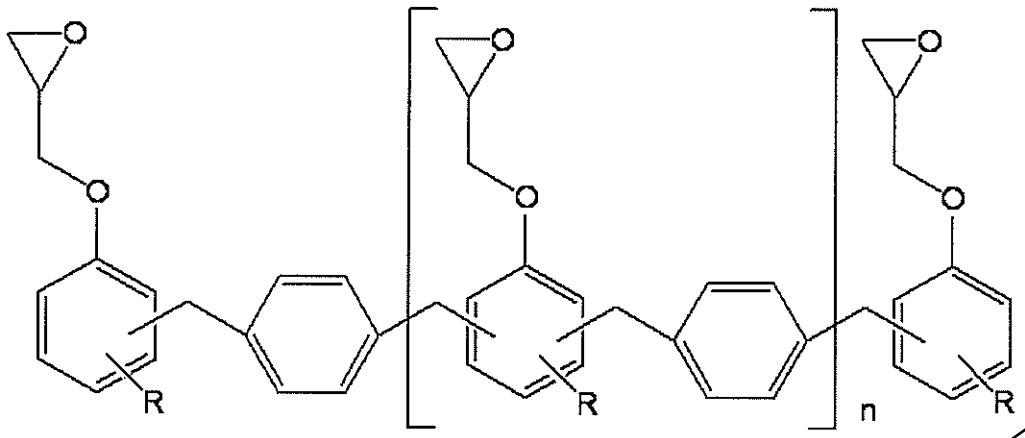
10. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (A) includes at least one epoxy resin selected from the group consisting of a biphenyl type epoxy resin represented by the formula (3), a phenol-aralkyl type epoxy resin having a phenylene skeleton represented by the formula (4), and a phenol-aralkyl type epoxy resin having a biphenylene skeleton represented by the formula (5):



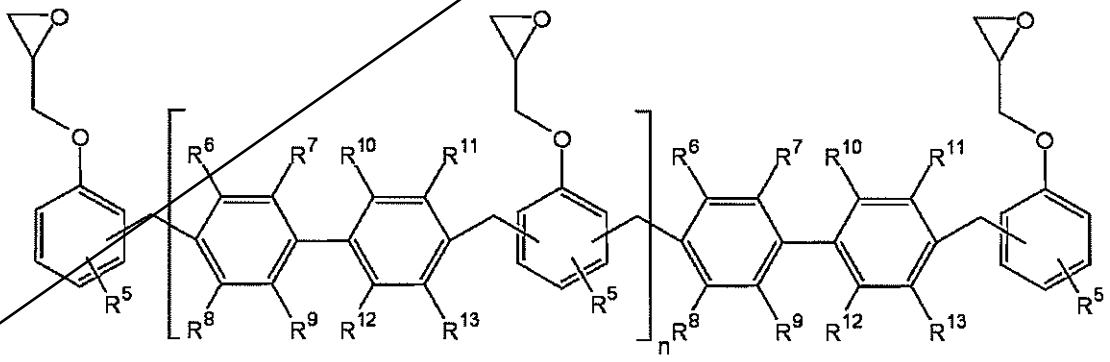
(3)

wherein in the formula (3), R^1 to R^4 each represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while R^1s to R^4s may be all identical with or different from each other; and n represents an integer from 0 to 3;



(4)

wherein in the formula (4), R represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while Rs may be all identical with or different from each other; and n represents an integer from 0 to 20; and



(5)

wherein in the formula (5), R^5 to R^{13} each represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while R^5s to R^{13}s may be all identical with or different from each other; and n represents an integer from 0 to 3.

11. A semiconductor device comprising a semiconductor element encapsulated with the epoxy resin composition for semiconductor encapsulation according to claim 1.

CLAIMS

1. An epoxy resin composition for semiconductor encapsulation, comprising:

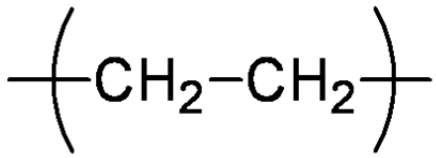
(A) an epoxy resin;

(B) a curing agent;

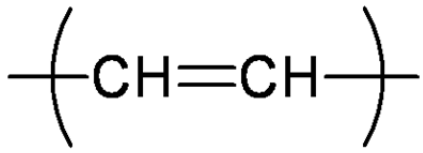
(C) an inorganic filler material;

(D) a hydrocarbon compound having structures of formula (1) and formula (2); and

(E) a hydrocarbon compound having an ester group:



(1)



(2)

,

wherein the component (D) is an alkene.

2. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is an alkene having 10 or more carbon atoms.

3. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is a 1-alkene having 10 or more carbon atoms.

4. The epoxy resin composition for semiconductor encapsulation according to claim 1,

wherein the component (D) is a 1-alkene having 28 or more carbon atoms.

5. The epoxy resin composition for semiconductor encapsulation according to any one of claims 1 to 4,

wherein the component (E) is at least one hydrocarbon compound selected from the group consisting of a compound obtained by semi-esterifying a copolymer of a 1-alkene and maleic anhydride with an aliphatic alcohol, and a montanic acid ester.

6. The epoxy resin composition for semiconductor encapsulation according to any one of claims 1 to 4,

wherein the component (E) is a compound obtained by semi-esterifying a copolymer of a 1-alkene having 5 to 60 carbon atoms and maleic anhydride with a long-chain aliphatic alcohol having 10 to 25 carbon atoms.

7. The epoxy resin composition for semiconductor encapsulation according to any one of claims 1 to 4,

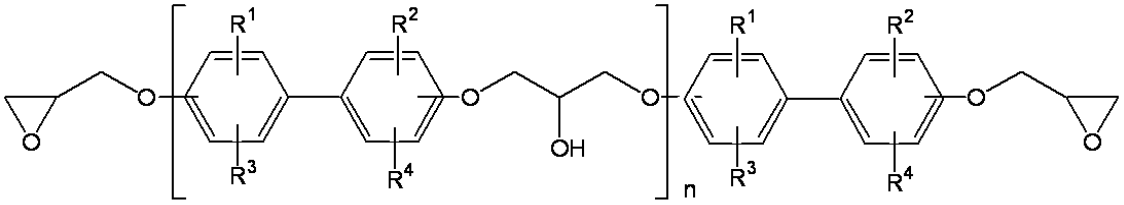
wherein the component (E) is a compound obtained by semi-esterifying a copolymer of a 1-alkene having 28 to 60 carbon atoms and maleic anhydride with a long-chain aliphatic alcohol having 15 to 20 carbon atoms.

8. The epoxy resin composition for semiconductor encapsulation according to any one of claims 1 to 7,

wherein the mixing ratio of the component (D) and the component (E) is 1:4 to 1:20 as a mass ratio.

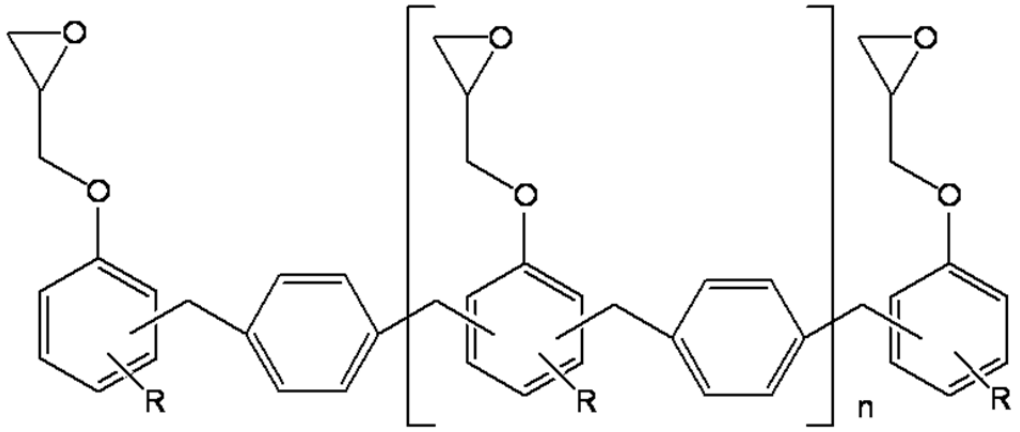
9. The epoxy resin composition for semiconductor encapsulation according to any one of claims 1 to 8,

wherein the component (A) includes at least one epoxy resin selected from the group consisting of a biphenyl type epoxy resin represented by the formula (3), a phenol-aralkyl type epoxy resin having a phenylene skeleton represented by the formula (4), and a phenol-aralkyl type epoxy resin having a biphenylene skeleton represented by the formula (5):



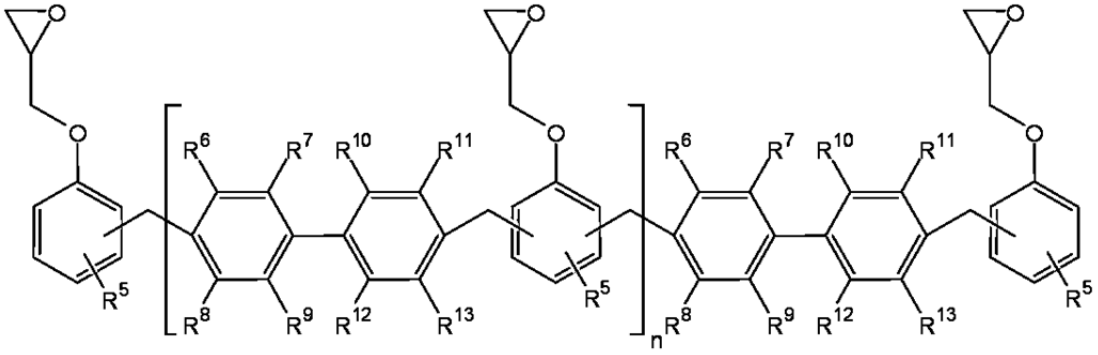
(3)

wherein in the formula (3), R^1 to R^4 each represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while R^1s to R^4s may be all identical with or different from each other; and n represents an integer from 0 to 3;



(4)

wherein in the formula (4), R represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while Rs may be all identical with or different from each other; and n represents an integer from 0 to 20; and



(5)

wherein in the formula (5), R^5 to R^{13} each represents a hydrogen atom, or a substituted or unsubstituted hydrocarbon group having 1 to 10 carbon atoms, while R^5s to R^{13}s may be all identical with or different from each other; and n represents an integer from 0 to 3.

10. A semiconductor device comprising a semiconductor element encapsulated with the epoxy resin composition for

semiconductor encapsulation according to any one of claims 1 to 9.