particles and a ratio of the (b) inorganic particles in the weight of the total solid fraction resulting from subtracting the weight of the (d) solvent from the total weight of the semiconductor resin composition is 60 wt% or more and 92 wt% or less.

[0011a]

In an aspect, there is provided a semiconductor resin composition which contains (a) an epoxy compound, (b) inorganic particles, (c) a polyimide, and (d) a solvent, wherein the semiconductor resin composition further contains (e) rubber particles and a ratio of the (b) inorganic particles based on the weight of the total solid fraction resulting from subtracting the weight of the (d) solvent from the total weight of the semiconductor resin composition is 60 wt% or more and 92 wt% or less, wherein the average particle diameter of the (e) rubber particles is smaller than or equal to the average particle diameter of the (b) inorganic particles, wherein the (c) polyimide has a structure represented by a general formula (2) or a general formula (3), has at least one functional group reactive with an epoxy group on its side chain, and has a structure represented by a general formula (1) as R^4 in the general formula (2) and the general formula (3), and the amount of the structure represented by the general formula (1) is 5 wt% or more and 15 wt% or less with respect to the total amount of the (c) polyimide:

sulfonic acid group and a thiol group, X represents a monovalent organic group, m is 8 to 200, α and β each represent an integer of 0 to 10 and α + β is an integer of 0 to 10, and a ratio between the structural units in which α + β is an integer of 1 to 10 and the structural units whose repeating number is m, is 20 to 90 mol%.

[0012]

There is provided a semiconductor resin film having, on a support, a semiconductor resin layer containing (a) an epoxy compound, (b) inorganic particles, (c) a polyimide and (e) rubber particles, wherein a ratio of the (b) inorganic particles in the weight of the semiconductor resin layer is 60 wt% or more and 92 wt% or less.

[0012a]

In another aspect, there is provided a semiconductor resin film having, on a support, a semiconductor resin layer containing (a) an epoxy compound, (b) inorganic particles, and (c) a polyimide, wherein a ratio of the (b) inorganic particles based on the weight of the semiconductor resin layer is 60 wt% or more and 92 wt% or less, and the semiconductor resin layer further contains (e) rubber particles, wherein the average particle diameter of the (e) rubber particles is smaller than or equal to the average particle diameter of the (b) inorganic particles, wherein the (c) polyimide has a structure represented by a general formula (2) or a general formula (3), has at least one

to 12-valent organic group, at least one of R^3 and R^4 contains at least one group selected from the group consisting of a 1,1,1,3,3,3-hexafluoropropyl group, an isopropyl group, an ether group, a thioether group and a SO_2 group, R^5 and R^6 each represent an organic group having at least one group selected from the group consisting of a phenolic hydroxyl group, a sulfonic acid group and a thiol group, X represents a monovalent organic group, m is 8 to 200, α and β each represent an integer of 0 to 10 and $\alpha + \beta$ is an integer of 0 to 10, and a ratio between the structural units in which $\alpha + \beta$ is an integer of 1 to 10 and the structural units whose repeating number is m, is 20 to 90 mol%.

[0012b]

In another aspect, there is provided a semiconductor device having a cured product of the composition resulting from removing the (d) solvent from the semiconductor resin composition as defined above, or a cured product of the semiconductor resin layer as defined above.

EFFECTS

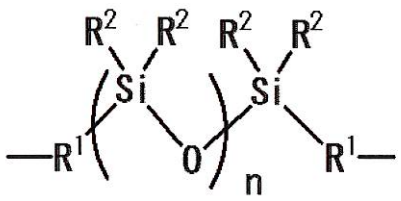
[0013]

In accordance with the present disclosure, it is possible to attain a semiconductor resin composition and a semiconductor resin film which impart heat resistance and in which a coefficient of linear expansion of a cured product is

CLAIMS

1. A semiconductor resin composition which contains (a) an epoxy compound, (b) inorganic particles, (c) a polyimide, and (d) a solvent, wherein the semiconductor resin composition further contains (e) rubber particles and a ratio of the (b) inorganic particles based on the weight of the total solid fraction resulting from subtracting the weight of the (d) solvent from the total weight of the semiconductor resin composition is 60 wt% or more and 92 wt% or less, wherein the average particle diameter of the (e) rubber particles is smaller than or equal to the average particle diameter of the (b) inorganic particles, wherein the (c) polyimide has a structure represented by a general formula (2) or a general formula (3), has at least one functional group reactive with an epoxy group on its side chain, and has a structure represented by a general formula (1) as R^4 in the general formula (2) and the general formula (3), and the amount of the structure represented by the general formula (1) is 5 wt% or more and 15 wt% or less with respect to the total amount of the (c) polyimide:

[Chem. 1]

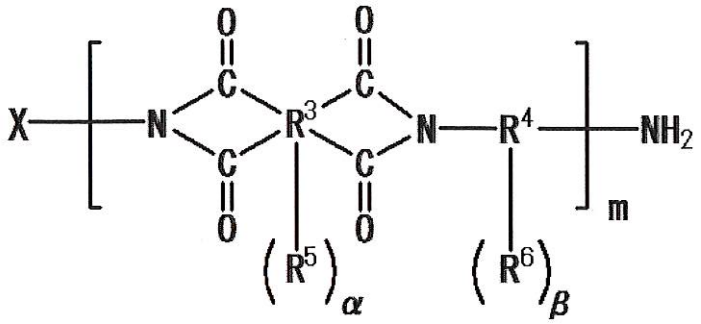


(1)

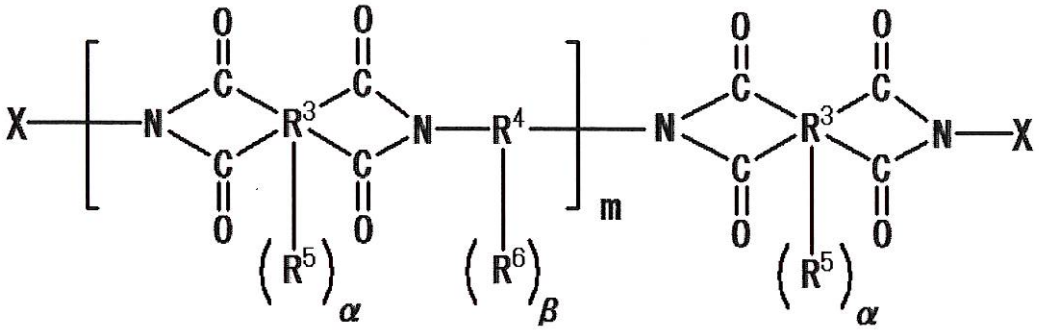
in which R^1 is a divalent hydrocarbon group, R^2 is a monovalent

hydrocarbon group, and n represents an integer of 1 to 2,

[Chem. 2]



(2)



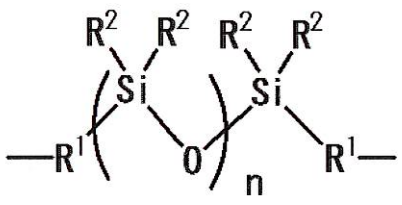
(3)

in which R^3 is a tetra- to 14-valent organic group, R^4 is a di- to 12-valent organic group, at least one of R^3 and R^4 contains at least one group selected from the group consisting of a 1,1,1,3,3,3-hexafluoropropyl group, an isopropyl group, an ether group, a thioether group and a SO_2 group, R^5 and R^6 each represent an organic group having at least one group selected from the group consisting of a phenolic hydroxyl group, a sulfonic acid group and a thiol group, X represents a monovalent organic group, m is 8 to 200, α and β each represent an integer of 0 to 10 and $\alpha + \beta$ is an integer of 0 to 10, and a ratio between the structural units in which $\alpha + \beta$ is an integer of 1 to 10 and the structural units whose repeating number is m, is 20 to 90 mol%.

of claims 1 to 5, wherein the (e) rubber particle is a core-shell rubber particle.

7. A semiconductor resin film having, on a support, a semiconductor resin layer containing (a) an epoxy compound, (b) inorganic particles, and (c) a polyimide, wherein a ratio of the (b) inorganic particles based on the weight of the semiconductor resin layer is 60 wt% or more and 92 wt% or less, and the semiconductor resin layer further contains (e) rubber particles, wherein the average particle diameter of the (e) rubber particles is smaller than or equal to the average particle diameter of the (b) inorganic particles, wherein the (c) polyimide has a structure represented by a general formula (2) or a general formula (3), has at least one functional group reactive with an epoxy group on its side chain, and has a structure represented by a general formula (1) as R^4 in the general formula (2) and the general formula (3), and the amount of the structure represented by the general formula (1) is 5 wt% or more and 15 wt% or less with respect to the total amount of the (c) polyimide:

[Chem. 3]

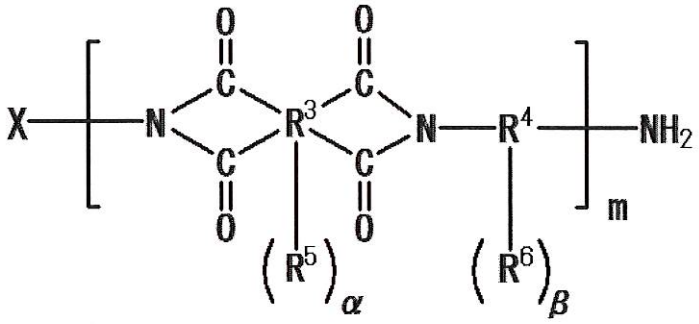


(1)

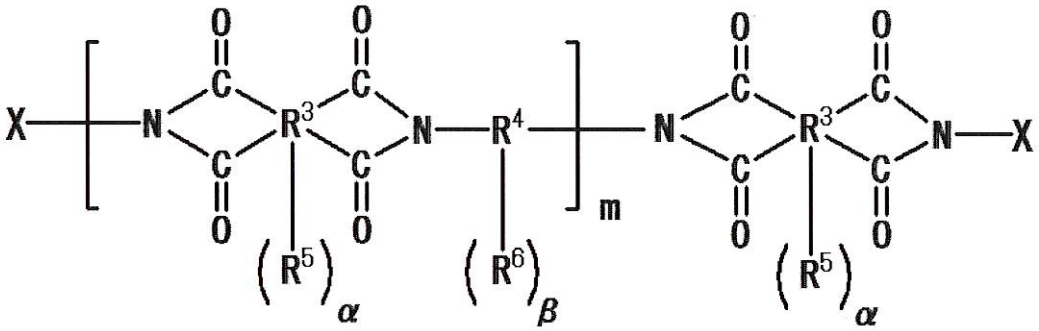
in which R^1 is a divalent hydrocarbon group, R^2 is a monovalent

hydrocarbon group, and n represents an integer of 1 to 2,

[Chem. 4]



(2)



(3)

in which R^3 is a tetra- to 14-valent organic group, R^4 is a di- to 12-valent organic group, at least one of R^3 and R^4 contains at least one group selected from the group consisting of a 1,1,1,3,3,3-hexafluoropropyl group, an isopropyl group, an ether group, a thioether group and a SO_2 group, R^5 and R^6 each represent an organic group having at least one group selected from the group consisting of a phenolic hydroxyl group, a sulfonic acid group and a thiol group, X represents a monovalent organic group, m is 8 to 200, α and β each represent an integer of 0 to 10 and $\alpha + \beta$ is an integer of 0 to 10, and a ratio between the structural units in which $\alpha + \beta$ is an integer of 1 to 10 and the structural units whose repeating number is m, is 20 to 90 mol%.