

According to the invention in a first aspect, there is provided ... c17
 " " " " second " , " " " " c12

- 6 -

resin to realize an excellent moldability and a sufficient strength though the PPS resin is excellent in storage stability and flame retargency.

BRIEF SUMMARY OF THE INVENTION

5 Therefore, an object of the present invention is
to provide a polyphenylene sulfide resin composition
which is excellent in moldability and in adhesivity to
other members, exhibits a high strength after the
curing thereof, and is excellent in storage stability
10 and in flame retargency.

Another object of the present invention is to provide a resin-encapsulated semiconductor device which is excellent in reliability with respect to a long term moisture resistance.

15 Namely, this invention provides a polyphenylene
sulfide resin composition, which comprises, in addition
to a polyphenylene sulfide resin and an inorganic
filler, at least one whisker selected from the group
consisting of titania whisker and aluminum borate
20 whisker.

This invention also provides a polyphenylene sulfide resin composition, which comprises (a) a polyphenylene sulfide resin; (b) an inorganic filler; (c) at least one kind of compounds selected from the group consisting of a polymerized indene, a phenol aralkyl resin and a novolak type phenol resin.

Further, this invention provides a polyphenylene

CLAIMS

1. A polyphenylene sulfide resin composition, which comprises a polyphenylene sulfide resin, an inorganic filler, and at least one whisker selected from the group consisting of titania whisker and aluminum borate whisker.

2. The polyphenylene sulfide resin composition according to claim 1, wherein said polyphenylene sulfide resin composition contains not more than 500 ppm of ionic impurities.

3. The polyphenylene sulfide resin composition according to claim 1, wherein a mixing ratio of said inorganic filler is 80 percent by weight or less based on the entire resin composition, and the mixing ratio of said whisker is 50 percent by weight or less based on the entire inorganic filler.

~~1.4. The polyphenylene sulfide resin composition according to claim 1,~~ wherein said inorganic filler is spherical silica having an average particle diameter of 30 μm or less.

~~2.6. The polyphenylene sulfide resin composition according to claim 1,~~ wherein said whisker is surface-treated by making use of a coupling agent.

3.7. A polyphenylene sulfide resin composition, which comprises;

(a) a polyphenylene sulfide resin;

(b) an inorganic filler; and

(c) at least one kind of compounds selected from the group consisting of a polymerized indene, a phenol aralkyl resin and a novolak type phenol resin.

47. The polyphenylene sulfide resin composition according to claim ³β, wherein said polyphenylene sulfide resin composition contains not more than 500 ppm of ionic impurities.

5β. The polyphenylene sulfide resin composition according to claim ³β, wherein said (c) component is an indene copolymer comprising an indene monomer, the ratio of said indene monomer to other comonomer should being set to meet a condition of $I/S \geq 1.5$ (where I represents the number of moles of indene monomer, and S denotes the number of moles of other comonomer).

6β. The polyphenylene sulfide resin composition according to claim ³β, wherein said (c) component is an indene polymer, a mixing ratio of said indene polymer to said polyphenylene sulfide resin being in the range of from 5 percent to 50 percent by weight based on the weight of the polyphenylene sulfide resin, and a mixing ratio of said inorganic filler to the polyphenylene sulfide resin is in the range of from 20 percent to 85 percent by weight based on the weight of the polyphenylene sulfide resin.

7β. The polyphenylene sulfide resin composition according to claim ³β, wherein said (c) component is phenol aralkyl resin and/or novolak phenol resin,

a mixing ratio of said (c) component being set to 30% by weight or less based on an entire weight of the resin composition.

5 ⁸₁. The polyphenylene sulfide resin composition according to claim ³₁, wherein said inorganic filler is spherical silica having an average particle diameter of 30 μm or less.

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10 ⁹₂. A polyphenylene sulfide resin composition, which comprises a polyphenylene sulfide resin and an inorganic filler; wherein

said polyphenylene sulfide resin includes a polyphenylene sulfide resin component exhibiting a non-Newtonian index (n) of 1.1 or more; and

15 said inorganic filler includes 5 to 40 wt%, based on a total amount thereof, of fine particles of inorganic filler having an average particle diameter of 1 μm or less.

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20 ¹⁰₃. The polyphenylene sulfide resin composition according to claim ⁹₂, wherein said polyphenylene sulfide resin composition contains not more than 500 ppm of ionic impurities.

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25 ¹¹₄. The polyphenylene sulfide resin composition according to claim ⁹₂, wherein said polyphenylene sulfide resin component exhibiting a non-Newtonian index (n) of 1.1 or more is mixed at a ratio of 30 wt% or more based on an entire polyphenylene sulfide resin matrix.

¹²
15. The polyphenylene sulfide resin composition according to claim ⁹~~12~~, wherein a mixing ratio of said inorganic filler is in a range of 25 to 80 wt% based on an entire resin composition.

5 ¹³
16. A polyphenylene sulfide resin composition, which comprises 20 to 70 wt% of a mixture consisting of a first polyphenylene sulfide resin and a second polyphenylene sulfide resin, and 30 to 80 wt% of an inorganic filler; wherein

10 said first polyphenylene sulfide resin has a melting viscosity ranging from 1 to 15 Pa·s, and said second polyphenylene sulfide resin has a melting viscosity ranging from 15 to 50 Pa·s and is of substantially non-crosslinking structure; and

15 a content of said first polyphenylene sulfide resin being 10 to 80 wt% based on said mixture, and a content of said second polyphenylene sulfide resin being 90 to 20 wt% based on said mixture.

20 ¹⁴
17. The polyphenylene sulfide resin composition according to claim ¹³~~16~~, wherein said mixture exhibiting a high-temperature crystallization temperature of 220°C to 240°C.

25 ¹⁵
18. The polyphenylene sulfide resin composition according to claim ¹³~~16~~, wherein said polyphenylene sulfide resin composition contains not more than 500 ppm of ionic impurities.

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19. The polyphenylene sulfide resin composition

according to claim ¹³~~16~~, wherein said second polyphenylene sulfide resin is of a linear structure and a high-temperature crystallization temperature of said second polyphenylene sulfide resin is 235°C or less.

5 ¹⁷~~20~~. The polyphenylene sulfide resin composition according to claim ¹³~~16~~, wherein said inorganic filler includes 5 to 40 wt%, based on a total amount thereof, of fine particles of inorganic filler having an average particle diameter of 1 μ m or less.

10 ¹⁸~~21~~. A resin-encapsulated semiconductor device comprising a semiconductor element, and a resin layer sealing said semiconductor element, wherein said resin layer is formed of a cured material of the resin composition claimed in claim ¹⁵~~17~~ or claim 2

15 ¹⁹~~22~~. A resin-encapsulated semiconductor device comprising a semiconductor element, and a resin layer sealing said semiconductor element, wherein said resin layer is formed of a cured material of the resin composition claimed in claim ³~~19~~.

20 ²⁰~~23~~. A resin-encapsulated semiconductor device comprising a semiconductor element, and a resin layer sealing said semiconductor element, wherein said resin layer is formed of a cured material of the resin composition claimed in claim ⁹~~20~~.

25 ²¹~~24~~. A resin-encapsulated semiconductor device comprising a semiconductor element, and a resin layer sealing said semiconductor element, wherein said resin

layer is formed of a cured material of the resin composition claimed in claim 16.¹³

5 25. ~~A polyphenylene sulfide resin composition,~~
substantially as hereinbefore described with reference
to Examples 1 to 38.

26. ~~A resin-encapsulated semiconductor device,~~
substantially as hereinbefore described with reference
to Examples 1 to 38 and FIGS. 2 to 4.