Patent Literature 3: Japanese Patent Laid-Open No. 2010-84072

Patent Literature 4: Japanese Patent Laid-Open No. 2005-113059

Patent Literature 5: United States Patent Publication No. 2007/098995.

Summary ~~of Invention~~

Technical Problem

[0005]

However, there are problems such that when an inorganic filler is incorporated into the conventional composition in large quantities, the thermal conductivity is not significantly enhanced because the dispersibility of the filler in resins deteriorates, and the toughness and adhesive properties are remarkably lowered.

[0006]

Thus, an object of the ~~present invention~~embodiments disclosed herein is to provide an adhesive composition being capable of controlling the dispersibility of a thermally conductive filler, having high thermal conductivity and being excellent in adhesion to heating elements and heat sink materials.

Solution to Problem

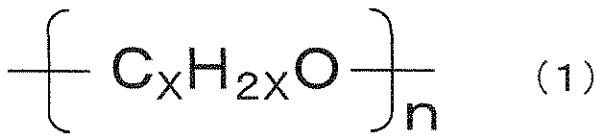
[0007]

In order to solve the above-mentioned problems, the present ~~invention~~disclosure is directed to an adhesive composition

containing an organic-solvent-soluble polyimide (A), an epoxy resin (B) and a thermally conductive filler (C), an organic-solvent-soluble polyimide (A) containing a structure represented by the following general formula (1) as a component derived from a diamine, and the content of a thermally conductive filler (C) in the adhesive composition being not less than 60% by volume.

[0008]

[Formula 1]



(1)

[0009]

(In general formula (1), X represents an integer of 1 to 10 inclusive and n represents an integer of 1 to 20 inclusive.)

In an aspect, there is provided an adhesive composition containing an organic-solvent-soluble polyimide (A), an epoxy resin (B) and a thermally conductive filler (C), an organic-solvent-soluble polyimide (A) containing a structure represented by the following general formula (1) as a component derived from a diamine, and the content of a thermally conductive filler (C) in the adhesive composition being not less than 60% by volume, and wherein the thermally conductive filler

(C) includes two or more fillers differing in the average particle diameter and contains at least a filler with an average particle diameter of 6 μm or more and 15 μm or less and a filler with an average particle diameter of 30 μm or more, the filler with an average particle diameter of 30 μm or more is aluminium nitride.

[Formula 1]

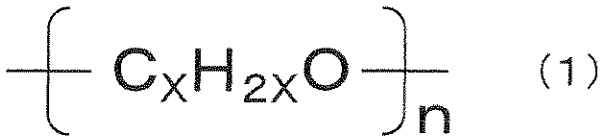
$$\left(C_X H_{2X} O \right)_n \quad (1)$$

(In general formula (1), X represents an integer of 1 to 10 inclusive and n represents an integer of 1 to 20 inclusive.)

In another aspect, there is provided an adhesive sheet containing an organic-solvent-soluble polyimide (A), an epoxy resin (B) and a thermally conductive filler (C), an organic-solvent-soluble polyimide (A) containing a structure represented by the following general formula (1) as a component derived from a diamine, and the content of a thermally conductive filler (C) in the sheet being not less than 60% by volume, and wherein the thermally conductive filler (C) includes two or more fillers differing in the average particle diameter and contains at least a filler with an average particle diameter of 6 μm or more and 15 μm or less and a filler with

an average particle diameter of 30 μm or more, the filler with an average particle diameter of 30 μm or more is aluminium nitride.

[Formula 3]



(1)

(In general formula (1), X represents an integer of 1 to 10 inclusive and n represents an integer of 1 to 20 inclusive.)

In a further aspect, there is provided a cured product of an adhesive composition as defined above or of an adhesive sheet as defined above.

In yet another aspect, there is provided a semiconductor device comprising a cured product of an adhesive composition as defined above or of an adhesive sheet as defined above.

Advantageous Effects ~~of Invention~~

[0010]

According to the present ~~invention~~disclosure, there can obtain an adhesive composition being capable of controlling the dispersibility of a thermally conductive filler, having high thermal conductivity and being excellent in adhesion to substrates and insulation properties.