

4. The adhesive composition of claim 1, based on the total weight of the composition, comprising:

- (a) 15-45% by weight of an epoxy component;
- (b) 20-40% by weight of thermally conductive material;
- (c) 0.5-4% by weight of a photoinitiator;
- (d) 5-25% by weight of a thermoplastic polymer;
- (e) 1-5% by weight of a hydroxyl-functional component; and
- (f) 1-25% by weight of a halogen-free flame retardant.

5. The adhesive composition of ~~any one of claims 1 to 4~~, wherein the epoxy component comprises one or more epoxy resins and/or monomers.

6. The adhesive composition of ~~any one of claims 1 to 4~~, wherein the thermally conductive material is one or more selected from ceramics, metal oxides, metal nitrides, metal hydroxides, BN, SiC, AlN, Al₂O₃, Si₃N₄.

7. The adhesive composition of ~~any one of claims 1 to 6~~, wherein the thermally conductive material has a thermal conductivity of 100 W/m·k or more.

8. The adhesive composition of claim 6, wherein the metal hydroxides are selected from a group consisting of aluminum hydroxide, alkali metal hydroxides and alkaline earth metal hydroxides.

9. The thermally conductive adhesive composition of ~~any one of claims 1 to 8~~, wherein the photoinitiator is one or more selected from photoinitiators including α -amino ketones group, photoinitiators including benzyl ketals group, photoinitiators including benzophenones group, aryl iodonium salts type photoinitiators, aryl sulfonium salts type photoinitiators, alkyl sulfonium salts type photoinitiators, iron aromatic salt type photoinitiators, and acylation sulfonylurea oxygen radical ketones.

10. The adhesive composition of ~~any one of claims 1 to 9~~, wherein the photoinitiator is comprises a mixture of triarylsulfonium hexafluorophosphate salts.

11. The adhesive composition of ~~any one of claims 1 to 10~~, wherein the thermoplastic

polymer ~~is comprises one of~~ an ethylene vinyl acetate copolymer component, an acrylic polymer resin, or an epoxy modified acrylic polymer resin.

12. The adhesive composition of claim 11, wherein the ethylene vinyl acetate copolymer component comprises one or more kinds of ethylene vinyl acetate copolymers.

13. The adhesive composition of ~~any one of claims 1 to 12~~, wherein the hydroxyl-functional component comprises one or more hydroxyl-containing compounds having a hydroxyl functionality of at least one.

14. The adhesive composition of ~~any one of claims 1 to 13~~, wherein the halogen-free flame retardant is selected from a group consisting of metal oxides, hydrous metal compounds, phosphorus containing compounds, ammonium polyphosphates, metal borates and graphite materials.

15. The thermally conductive adhesive composition of ~~any one of claims 1 to 14~~, further comprising 0-5% by weight of an additive, wherein the additive is one or more selected from tackifiers, antioxidants, coupling agents, thickeners, auxiliary flame retardant agents, anti-foaming agents, pigments, surfactants, and surface-modifiers.

16. A thermally conductive pressure-sensitive adhesive tape, comprising:
a backing layer; and
a first thermally conductive adhesive layer disposed on one side of the backing layer and comprising the composition of ~~any one of claims 1 to 15~~.

17. The adhesive tape of claim 16, further comprising:
a second thermally conductive adhesive layer, disposed on another side of the backing layer and comprising the composition of ~~any one of claims 1 to 15~~; and
a release liner disposed on one side of the first thermally conductive adhesive layer opposite to the backing layer.

18. The adhesive tape of claim 16, further comprising:
a release liner disposed on one side of the first thermally conductive adhesive layer opposite to the backing layer.

19. The adhesive tape of ~~any one of~~ claims 16-~~to~~18, wherein the backing layer is selected from PI film, PET film, or glass fibre mesh.

20. The adhesive tape of claim 18, wherein the backing layer ~~is~~ comprises a super thin plastic film, or insulating woven or nonwoven material.