CLAIMS

1. A bonding film for bonding a semiconductor element and a substrate,

the bonding film comprising:

an electroconductive bonding layer formed by molding an electroconductive paste including metal fine particles (P) into a film form; and

a tack layer having tackiness and laminated on the electroconductive bonding layer,

wherein the tack layer includes 0.1% to 1.0% by weight of metal fine particles (M) with respect to the metal fine particles (P) in the electroconductive bonding layer,

the metal fine particles (M) have a melting point of 250°C or lower,

wherein the metal fine particles (P) have an average primary particle size of 10 to 500 nm, and

wherein the metal fine particles (M) have an average primary particle size of 1 to 3 μm.

2. The bonding film according to claim 1, wherein the electroconductive paste includes an organic solvent (S).

3. The bonding film according to claim 1 or 2, wherein the metal fine particles (P) include copper or silver.

4. The bonding film according to any one of claims 1 to 3, wherein the electroconductive paste includes an organic

binder (R).

5. The bonding film according to any one of claims 1 to 4, wherein the tack layer is formed from one kind or two or more kinds selected from polyglycerin, a glycerin fatty acid ester, a polyglycerin fatty acid ester, phosphines, phosphites, sulfides, disulfides, trisulfides, and sulfoxides.

6. The bonding film according to any one of claims 1 to 5, wherein the metal fine particles (M) include tin.

7. The bonding film according to any one of claims 2 to 6, wherein the organic solvent (S) includes an organic solvent (SC) having a boiling point at normal pressure of 100°C or higher, the organic solvent (SC) being formed from an alcohol and/or polyhydric alcohol having one or two or more hydroxyl groups in the molecule.

8. The bonding film according to any one of claims 4 to 7, wherein the organic binder (R) is one kind or two or more kinds selected from a cellulose resin-based binder, an acetate resin-based binder, an acrylic resin-based binder, a urethane resin-based binder, a polyvinylpyrrolidone resin-based binder, a polyamide resin-based binder, a butyral resin-based binder, and a terpene-based binder.

9. A tape for wafer processing comprising:

a tacky adhesive film having a base material film and a tacky adhesive layer provided on the base material film; and

the bonding film according to any one of claims 1 to 8,

wherein the electroconductive bonding layer of the bonding film is provided on the tacky adhesive layer.

10. A method for producing a bonded body, the method comprising a bonding step of disposing a bonding film between a semiconductor element and a substrate, the bonding film having an electroconductive bonding layer formed by molding an electroconductive paste including metal fine particles (P) into a film form; and a tack layer having tackiness, including metal fine particles (M), and being laminated on the electroconductive bonding layer, subsequently heating the assembly, and after the tack layer is thermally decomposed and the metal fine particles (M) melt and then react with the electrode of the semiconductor element, sintering the metal fine particles (P) of the electroconductive bonding layer to bond the semiconductor element and the substrate, wherein the metal fine particles (P) have an average primary particle size of 10 to 500 nm, and wherein the metal fine particles (M) have an average primary particle size of 1 to 3 μm.

11. A bonded body of a semiconductor and a substrate,

the bonded body comprising, on a substrate, an

electroconductive connection member formed from a porous metal body and comprising a semiconductor element thereon,

wherein the bonded body is bonded using the bonding film according to any one of claims 1 to 8,

the porous metal body is a sintered body of metal fine particles (P) included in the bonding film according to any one of claims 1 to 8, and

at the interface between the porous metal body and an electrode of the semiconductor element, an alloy phase or a metal compound phase of metal fine particles (M) included in the bonding film according to any one of claims 1 to 8 and the electrode is formed.

12. The bonded body of a semiconductor and a substrate according to claim 11, wherein the porosity of the porous metal body is 1% to 6% by volume, and the average pore diameter is 10 to 60 nm.

13. A pasted body comprising:

a tacky adhesive film having a base material film and a tacky adhesive layer provided on the base material film;

a bonding film for bonding a semiconductor element and a substrate; and

a semiconductor wafer pasted together,

wherein the bonding film has an electroconductive bonding layer formed by molding an electroconductive paste including metal fine particles (P) into a film form; and a tack layer having tackiness and laminated on the

electroconductive bonding layer,

the electroconductive bonding layer is pasted to the tacky adhesive layer, the semiconductor wafer is pasted to the tack layer,

the tack layer is thermally decomposable and includes 0.1% to 1.0% by weight of metal fine particles (M) with respect to the metal fine particles (P) in the electroconductive bonding layer, and

after the tack layer is thermally decomposed by heating at the time of bonding and the metal fine particles (M) melt and react with an electrode of the semiconductor element, the metal fine particles (P) of the electroconductive bonding layer are sintered to bond the semiconductor element and the substrate, wherein the metal fine particles (P) have an average primary particle size of 10 to 500 nm, and wherein the metal fine particles (M) have an average primary particle size of 1 to 3 μm.