

Claims

1. A pressure-sensitive adhesive tape for semiconductor substrate fabrication, comprising:

a base material; and

a pressure-sensitive adhesive layer laminated on one surface of the base material,

the pressure-sensitive adhesive tape being used for temporarily fixing a sealed semiconductor connection to the base material through the pressure-sensitive adhesive layer when the sealed semiconductor connection including a substrate, a plurality of semiconductor elements disposed on the substrate, and a sealing portion sealing the plurality of semiconductor elements is cut in a thickness direction thereof to obtain a plurality of semiconductor sealing bodies, and the temporarily fixing being carried out in a state where the sealing portion and the pressure-sensitive adhesive layer are in contact with each other,

wherein the pressure-sensitive adhesive layer contains a peeling agent for reducing adhesiveness to the sealing portion when the semiconductor sealing bodies are peeled from the pressure-sensitive adhesive tape for semiconductor substrate fabrication,

wherein the sealing portion is formed of a sealing material containing an epoxy group-containing compound,

wherein the epoxy group-containing compound has a double bond in a molecular structure thereof, and

wherein the peeling agent is a silicone-based oil or a fluorine-based surfactant.

2. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 1,

wherein the peeling agent is the silicone-based oil, and the silicone-based oil is a modified silicone oil.

3. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 1 or 2,

wherein the pressure-sensitive adhesive layer further contains a base resin having pressure-sensitive adhesiveness.

4. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 3,

wherein a glass transition point of the base resin is equal to or lower than -30°C .

5. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 3 or 4,

wherein a weight-average molecular weight of the base resin is 300,000 to 1,800,000.

6. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to any one of claims 3 to 5, wherein the pressure-sensitive adhesive layer further contains a curable resin to be cured by application of energy.

7. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 6, wherein a contact angle of a surface of the pressure-sensitive adhesive layer to hexadecane is equal to or higher than 20° before the application of energy.

8. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to claim 6 or 7, wherein a contact angle of a surface of the pressure-sensitive adhesive layer to hexadecane is equal to or higher than 10° after the application of energy.

9. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to any one of claims 1 to 8, wherein a thickness of the pressure-sensitive adhesive layer is $1\text{ }\mu\text{m}$ to $30\text{ }\mu\text{m}$.

10. The pressure-sensitive adhesive tape for semiconductor substrate fabrication according to any one of claims 6 to 9,

wherein an adhesive force between the pressure-sensitive adhesive layer and the sealing portion before the application of energy is equal to or higher than 70 cN/25 mm and less than 1000 cN/25 mm, and

the adhesive force between the pressure-sensitive adhesive layer and the sealing portion after the application of energy is equal to or higher than 60 cN/25 mm and less than 90 cN/25 mm.

11. A method for manufacturing a semiconductor device using the pressure-sensitive adhesive tape for semiconductor substrate fabrication according to any one of claims 1 to 10, comprising:

a sealed semiconductor connection forming step of obtaining the sealed semiconductor connection by sealing the plurality of semiconductor elements loaded on the substrate so as to be covered with the sealing portion,

an attaching step of attaching the pressure-sensitive adhesive tape for semiconductor substrate fabrication to the sealed semiconductor connection such that the sealing portion and the pressure-sensitive adhesive layer are in contact with each other;

a dicing step of forming the plurality of semiconductor sealing bodies on the pressure-sensitive adhesive tape for semiconductor substrate fabrication by dicing and singulating

the sealed semiconductor connection in a thickness direction for each of the semiconductor elements included in the sealed semiconductor connection;

a peeling step of peeling each of the semiconductor sealing bodies from the pressure-sensitive adhesive tape for semiconductor substrate fabrication after energy is applied to the pressure-sensitive adhesive layer; and

a bump connecting step of forming each of bumps on a side of the substrate opposite to the semiconductor element such that each bump is electrically connected to an electrode included in the semiconductor element through a conductor post, which is formed in advance on the substrate included in each semiconductor sealing body.