

BONDING APPARATUS AND BONDING METHOD

[Technical Field]

[0001] The present disclosure relates to a bonding apparatus and a bonding method.

5 [Background Art]

[0002] A mounting technology for bonding an electronic component such as a semiconductor die onto a substrate is known. For example, Patent Literature 1 discloses a technique for inhibiting an adhesive from adhering to a semiconductor die due to creeping up of the adhesive. In the technique of Patent Literature 1, the semiconductor

10 die is bonded to a substrate via a resin film.

[Citation List]

[Patent Literature]

[0003] [Patent Literature 1] Japanese Patent Laid-Open No. 2015-35493

15 [Summary of Invention]

[Technical Problem]

[0004] However, in the configuration of Patent Literature 1, the film is melted by heat of the heater. As a result, the molten film may stick to a bonding tool. Film sticking causes a device to stop. Accordingly, since productivity of the device is reduced, a

20 maintenance operation is required.

[0005] A bonding apparatus and a bonding method of the present disclosure have been made in view of such circumstances. The present disclosure describes a bonding apparatus and a bonding method in which a decrease in productivity of a bonding apparatus using a film for preventing creeping up can be inhibited in the device using.

25 [Solution to Problem]

a bonding mode is called face-down bonding. The second main surface 102b is a back surface opposite to the first main surface 102a. The semiconductor die 102 is made of a semiconductor material such as silicon.

[0018] The electrode pads 104 are electrically connected to electrode pads 107 formed on the first main surface 101a. The bump electrodes 106 are provided on the electrode pads 104. The protective film 108 is provided around the plurality of bump electrodes 106. In other words, outer peripheral end parts of the electrode pads 104 are covered with the protective film 108. On the other hand, central parts of the electrode pads 104 are exposed from the protective film 108. These exposed parts are parts electrically connected with the bump electrodes 106. Materials of the electrode pads 104 and the bump electrodes 106 are, for example, materials having conductivity. For example, the electrode pads 104 may be made of aluminum or copper. Further, for example, the bump electrodes 106 may be made of gold or the like.

[0019] Next, the bonding apparatus 1 will be described. As shown in FIG. 1, the bonding apparatus 1 includes a wafer stage 2, an intermediate stage 3, a bonding stage 4, a bonding unit 6, an XY stage 7, a bonding control unit (hereinafter simply referred to as a “control unit 8”), and an imaging unit 9.

[0020] A wafer 110 is temporarily placed on the wafer stage 2. The wafer 110 is fixed to a mounting surface 2a of the wafer stage 2 with an adhesive film. The wafer 110 includes a plurality of diced semiconductor dies 102. The wafer 110 has a first main surface 110a and a second main surface 110b. The first main surface 110a has a predetermined circuit pattern. The first main surface 110a corresponds to the first main surface 102a of the semiconductor die 102. The second main surface 110b is a back surface opposite to the first main surface 110a. The second main surface 110b corresponds to the second main surface 102b of the semiconductor die 102.

peeling operation (S7c: a second operation). Then, after the peeling operation has been completed, it is checked again whether or not the film 200 is stuck to the bonding surface 21S (S7a). Then, when the sticking is not detected, the steps are performed again from the step S1. When sticking is detected, the step S7b is performed again.

5 [0079] Next, effects of the bonding apparatus 1 and the bonding method will be described.

[0080] In the bonding method and the bonding apparatus 1, the bonding mechanism 20 holds the semiconductor die 102 via the film 200 supplied to the bonding surface 21S. Then, the bonding mechanism 20 provides heat from the heater 22 to the bonding surface
10 21S, and performs thermocompression bonding of the held semiconductor die 102 to the substrate 101 via the adhesive material. The bonding surface 21S is covered with the film 200 even if the adhesive material creeps up. Therefore, it becomes possible to protect the bonding surface 21S from the adhesive material that creeps up. Furthermore, when heat for thermocompression bonding is provided, the heat is transmitted to the
15 semiconductor die 102 via the bonding surface 21S and the film 200. As a result, the heat may cause the film 200 to stick to the bonding surface 21S. Therefore, the bonding apparatus 1 causes the remover bar 43 to enter between the film 200 and the bonding surface 21S. By this operation, the film 200 stuck to the bonding surface 21S is peeled off. Therefore, the bonding apparatus 1 can protect the bonding surface 21S from the
20 adhesive material and can eliminate sticking of the film 200 to the bonding surface 21S. Therefore, the bonding apparatus 1 that uses the film 200 to prevent the creeping up can inhibit a decrease in productivity.

[0081] Incidentally, as a configuration for eliminating sticking of the film 200 to the bonding surface 21S, the relative positions of the bonding mechanism 20 and the film
25 conveyance mechanism 30 in the vertical direction may be changed. For example, the