Description

Method for Cleaning Semiconductor Substrate and Method for Producing Processed Semiconductor Substrate

Technical Field

[0001]

The present invention relates to a method for cleaning a semiconductor substrate (hereinafter may be referred to as a "semiconductor substrate cleaning method"), to a method for producing a processed semiconductor substrate (hereinafter may be referred to as a "processed semiconductor substrate production method"), and to a composition for removing an adhesive layer (hereinafter may be referred to simply as a "remover composition").

Background Art

[0002]

Conventionally, electronic elements and wires are 2-dimensionally (within a plane) integrated on a semiconductor wafer. In a trend toward further integration, demand has arisen for a semiconductor integration technique which achieves 3-dimensional integration (i.e., stacking) in addition to 2-dimensional integration. In the technique of 3-dimensional integration, a number of layers are stacked with wire connection by the mediation of through silicon vias (TSVs). In integration of multiple layers, each component wafer to be stacked is thinned by polishing (i.e., grinding)

Claims

1. A semiconductor substrate cleaning method comprising applying an adhesive composition onto the semiconductor substrate to thereby form an adhesive layer, and removing the adhesive layer provided on the semiconductor substrate by use of a remover composition, wherein

the adhesive composition contains an adhesive component (S), and the adhesive component (S) comprises a siloxane adhesive containing a polyorganosiloxane component (A) which is curable through hydrosilylation;

the remover composition contains a solvent but no salt;

the solvent comprises one or more species selected from among di(n-butyl) ether, n-decane, di(n-pentyl) ether, 1-amino-n-pentane, p-menthane, butyl acetate, cyclohexane, di(n-propyl) sulfide, pentyl acetate, di(n-butyl) sulfide, mesitylene, limonene, and p-cymene; and

the remover composition exhibits a contact angle smaller than 31.5° with respect to the adhesive layer.

2. A semiconductor substrate cleaning method according to claim 1, wherein the molecular weight is 70 or more.

3. A semiconductor substrate cleaning method according to claim 1 or 2, wherein the adhesive composition which contains an adhesive component (S) further comprises at least one species selected from among an acrylic resin adhesive, an epoxy resin adhesive, a polyamide adhesive, a polystyrene adhesive, a polyimide adhesive, and a phenolic resin

adhesive.

4. A processed semiconductor substrate production method comprising:

a first step of producing a laminate having a semiconductor substrate, a support substrate, and an adhesive layer formed from an adhesive composition which is applying onto the semiconductor substrate or the support substrate, and adhering the semiconductor substrate to the support substrate by the mediation of the adhesive layer;

a second step of processing the semiconductor substrate of the produced laminate;

a third step of separating the semiconductor substrate and the adhesive layer from the support substrate; and

a fourth step of removing the adhesive layer on the semiconductor substrate by use of a remover composition, wherein

the adhesive composition contains an adhesive component (S), and the adhesive component (S) comprises a siloxane adhesive containing a polyorganosiloxane component (A) which is curable through hydrosilylation;

the remover composition contains a solvent but no salt;

the solvent comprises one or more species selected from among di(n-butyl) ether, n-decane, di(n-pentyl) ether, 1-amino-n-pentane, p-menthane, butyl acetate, cyclohexane, di(n-propyl) sulfide, pentyl acetate, di(n-butyl) sulfide, mesitylene, limonene, and p-cymene; and

the remover composition exhibits a contact angle

smaller than 31.5° with respect to the adhesive layer.

5. A processed semiconductor substrate production method according to claim 4, wherein the molecular weight is 70 or more.

6. A processed semiconductor substrate production method according to claim 4 or 5, wherein the adhesive component (S) further comprises at least one species selected from among an acrylic resin adhesive, an epoxy resin adhesive, a polyamide adhesive, a polystyrene adhesive, a polyimide adhesive, and a phenolic resin adhesive.