

GRINDING RING SET FOR SEMICONDUCTOR WAFER IN CHEMICAL AND MECHANICAL GRINDING PROCESS

FIELD OF THE INVENTION

5 The present invention related to a grinding positioning ring used in chemical and mechanic process of semiconductor wafers, and in particular to a grinding positioning ring of positioning of wafer in the grinding process.

10 BACKGORUND OF THE INVENTION

 In the prior art, the grinding positioning ring used in the semiconductor grinding process is made integrally with the same material. Afterwards, under the consideration of functions of the base ring and grinding ring set, they are made of different material.

15 In the prior art, the base ring is made of stainless steel or metal alloy with a ring form. One side of the base ring is a locking surface with a plurality of positioning holes. Another side of the base ring is a combining surface with a plurality of combining holes therein for locking with combining elements. Furthermore, the grinding ring

20 set is made of high molecular plastic material. A first side of the grinding ring set is a combining surface with a plurality of guiding holes and another side of the grinding ring set is a grinding surface.

 By combining the base ring and the grinding ring set which are made of different materials, different effects are presented. In the

25 prior art, the heterogeneous property is based on the fact that the ring base is made of hard stainless steel or metal alloy with higher hardness, while the grinding portion is made of higher molecular plastic material with lower hardness.

 However, in this prior art, under the process of grinding, the

30 grinding positioning ring dramatically rubs the wager and other

working pieces so as to generate a react force so as to destroy the structure of the base ring and the grinding ring set. Furthermore, the base ring is made of stainless steel or metal alloy which is expensive due to the higher purchase cost and manufacturing cost.

5 Furthermore, the prior art is heavy and easy to rust. Furthermore, the combination of the metal material and the plastic material will be destroyed so that the two rings separate so that the yield ratio of the wager is low. This will greatly induce the manufacturing cost and the process become complicated. The strength of the combination of

10 the metal material and the plastic material is weak with less flexibility and stress. The separation of the two rings cause the grinding positioning ring to be wasted. However, in summary, the consumption of the material is increased and the cost is also increased.

15 In some improvement structure, plastics (such as PPS) is used to make the base ring and the grinding ring set as an integral body. No metal is used and thus the cost is lowered. However, in this structure, the base ring and the grinding ring set are made integrally so that when the grinding ring set destroys, the whole grinding

20 positioning ring must be discarded. It is uneconomic.

SUMMARY OF THE INVENTION

Accordingly, to improve the defects in the prior art, the present invention provides a grinding ring set for semiconductor wafer in

25 chemical and mechanical grinding process, wherein the whole weight is light with a preferred strength, lower cost, less processes, and reduction of rust, etc. Furthermore, plastic is more flexible than metal.

To achieve above object, A grinding ring set for semiconductor

30 wafer in chemical and mechanical grinding process; the grinding ring

set comprising

a grinding surface and

an attaching surface attaching to the grinding surface; and

wherein material of the attaching ring is selected from
5 High-density polyethylene (HDPE), Polyethylene (PE),
polyphenylene sulfide (PPS), polybutylene terephthalate (PBT),
carbin-filled PEEK, polyetherimide (PEI), polyether ether ketone
(PEEK), polyethylene terephthalate (PET), polytetrafluoroethylene
(PTFE), polybenzimidazole (PBI), polyamide-imide (PAI), PETP,
10 PVC, NYLON, POM, ABS, PTFE, PVDF, or the combination thereof,
or compound of two or more plastic additives, which has a weight
percentage between 0.9-1.8g/cm³. The grinding ring set is made of
plastic materials, but is different from those used in the attaching
ring.

15 The various objects and advantages of the present invention will
be more readily understood from the following detailed description
when read in conjunction with the appended drawing.

BRIEF DESCRIPTION OF THE DRAWINGS

20 Fig. 1 is an assembled perspective view in the first embodiment
of the present invention.

Fig. 2 is a partial schematic view showing the attaching ring of
the present invention.

Fig. 3A is an exploded view of the present invention, which is
25 viewed from a first viewing angle.

Fig. 3B is an exploded view of the present invention, which is
viewed from a second viewing angle.

Fig. 4A is a partial cross sectional view showing the
combinational state of the present invention.

30 Fig. 4B is another partial cross sectional view showing the

combining state of the present invention.

Fig. 5A is a schematic view showing the combination of the present invention.

Fig. 5B is another schematic view showing the combination of the present invention.

Fig. 6 is a perspective view showing the second embodiment of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

In order that those skilled in the art can further understand the present invention, a description will be provided in the following in details. However, these descriptions and the appended drawings are only used to cause those skilled in the art to understand the objects, features, and characteristics of the present invention, but not to be used to confine the scope and spirit of the present invention defined in the appended claims.

The present invention relates to a grinding ring set 1 for semiconductor wafer in chemical and mechanical grinding process, referring to Figs. 3A to 3B. The positioning ring 1 includes a grinding surface 12 and an attaching surface attaching to the grinding surface 12.

With reference to Fig. 2, in the present invention, material of the attaching ring 11 is selected from High-density polyethylene (HDPE), Polyethylene (PE), polyphenylene sulfide (PPS), polybutylene terephthalate (PBT), carbin-filled PEEK, polyetherimide (PEI), polyether ether ketone (PEEK), polyethylene terephthalate (PET), polytetrafluoroethylene (PTFE), polybenzimidazole (PBI), polyamide-imide (PAI), PETP, PVC, NYLON, POM, ABS, PTFE, PVDF, or the combination thereof, or compound of two or more plastic additives, which has a weight percentage between

0.9-1.8g/cm³. The material of the attaching ring 11 is not limited to the above mentioned components. Other plastic materials having identical or similar effects as said above are permissible in the present invention.

5 In the present invention, the grinding ring set 12 may also be made of plastic materials, but is different from those used in the attaching ring 11. Therefore, by above mentioned design, the whole weight is light with a preferred strength, lower cost, less processes, and reduction of rust, etc. Furthermore, plastic is more flexible than
10 metal.

With reference to Figs. 3A, 3B, 4A, 4B, 5A and 5B, in the present invention, the attaching ring 11 is formed with a plurality of through holes 110. The grinding surface 12 is formed with a plurality of recesses 120 corresponding to the through holes 110.
15 Each recess 120 has a long hole 120A and an enlarged hole 120B. A plurality of combining studs 14 are used to combine the attaching ring 11 to the grinding ring set 12. Each stud 14 has a body 141. A rear end of the body 141 has an enlarged hat 142. An interior width of the enlarged hole 120B is larger than an outer diameter of the hat
20 142 so as to receive the hat 142 therein. A width of the long hole 120A is smaller than that of the outer diameter of the hat 142. With reference to Figs. 4A, 4B, 5A and 5B, by the studs 14 pass through the through holes 110 to the recesses 120, the hat 142 will resist against a lower side of the long hole 120A. The body 141 of the stud 14 may
25 be screwed to the through hole 110 of the attaching ring 11 so as to form with a simple combination without interfering to the grinding ring set 12.

With reference to Fig. 6, it is illustrated that the grinding ring set 1A of the present invention is formed with a plurality of radiating
30 recesses at a lower side thereof to be used to semiconductor wafer

chemical mechanic grinding process.

The present invention is thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the present
5 invention, and all such modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

WHAT IS CLAIMED IS:

1. A grinding ring set for semiconductor wafer in chemical and mechanical grinding process; the grinding ring set comprising:

a grinding surface;

5 an attaching surface attaching to the grinding surface; and

wherein material of the attaching ring is selected from High-density polyethylene (HDPE), Polyethylene (PE), polyphenylene sulfide (PPS), polybutylene terephthalate (PBT), carbin-filled PEEK, polyetherimide (PEI), polyether ether ketone (PEEK), polyethylene terephthalate (PET), polytetrafluoroethylene (PTFE), polybenzimidazole (PBI), polyamide-imide (PAI), PETP, PVC, NYLON, POM, ABS, PTFE, PVDF, or the combination thereof, or compound of two or more plastic additives, which has a weight percentage between 0.9-1.8g/cm³.

15 2. The grinding ring set for semiconductor wafer in chemical and mechanical grinding process as claimed in claim 1, wherein the grinding ring set is made of plastic materials, but is different from those used in the attaching ring.

3. The grinding ring set for semiconductor wafer in chemical and mechanical grinding process as claimed in claim 1, wherein the attaching ring is formed with a plurality of through holes; the grinding surface is formed with a plurality of recesses corresponding to the through holes; each recess has a long hole and an enlarged hole; a plurality of combining studs are used to combine the attaching ring to the grinding ring set; each stud has a body; a rear end of the body has an enlarged hat; an interior width of the enlarged hole is larger than an outer diameter of the hat so as to receive the hat therein; a width of the long hole is smaller than that of the outer diameter of the hat; by the studs pass through the through holes to the recesses, the hat will resist against a lower side of the long hole.

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4. The grinding ring set for semiconductor wafer in chemical and mechanical grinding process as claimed in claim 3, wherein the body of the stud is screwed to the through hole of the attaching ring.