Accordingly, the parameter related to the coefficient of friction of the heatsink 100 corresponds to the coefficient of friction between the elastomeric coating 104 and the plate surface 304.

[0037] The plate 302 may be made of any suitable material such that the plate surface 304 has properties which enable determination of the parameter related to the coefficient of friction of the heatsink 100. The plate 302 may be made of a ceramic material and the plate surface 304 may be generally smooth. The plate surface 304 may be polished or have a low surface roughness.

[0038] When the inclination angle α is zero (Fig. 8), the plate surface 304 is parallel to the horizontal axis X_{300} and there is no frictional force between the plate surface 304 and the heatsink 100. The plate 302 is rotated about the pivot axis Y_{300} until the heatsink 100 begins to slide on the plate surface 304. One or more rotational sensors 312 are used to measure and/or record the inclination angle α at which the heatsink 100 begins to slide (i.e., the "critical angle α_c" or the sliding angle α_c"). The parameter related to the coefficient of friction may be this critical angle α_c. Alternatively, the critical angle α_c may be used to determine the parameter related to the coefficient of friction.

[0039] Sliding of the heatsink 100 may be observed using visual inspection. In some embodiments, one or more motion sensors (not shown) are used to detect the motion of the heatsink 100 in order to determine the critical angle α_c at which the heatsink 100 begins to slide. In some embodiments, the rotational sensors 312 are linked

CLAIMS:

1. A method for implanting semiconductor structures with ions, the semiconductor structure having a front surface and rear surface opposite the front surface, the method comprising:

positioning a semiconductor structure on a heatsink with the rear surface of the semiconductor structure contacting the heatsink;

implanting ions through the front surface of the semiconductor structure while the semiconductor structure is positioned on the heatsink to form a damage region in the semiconductor structure;

measuring a parameter related to the coefficient of friction of the heatsink, the parameter related to the coefficient of friction being the sliding angle or break-away force for the heatsink on a surface; and

comparing the parameter to a baseline range;

wherein:

(1) if the parameter falls outside of the baseline range, the heatsink is reconditioned; and

(2) if the parameter falls within the baseline range, the heatsink is used during ion implantation of additional semiconductor structures.

2. The method as set forth in claim 1 wherein the heatsink comprises a substrate and an elastomeric coating disposed on at least one surface of the substrate, the elastomeric coating contacting the semiconductor structure during ion implantation.

3. The method as set forth in claim 1 or claim 2 wherein a plurality of semiconductor structures are

implanted with ions before measuring the parameter related to the coefficient of friction of the heatsink.

4. The method as set forth in any one of claims 1 to 3 wherein the semiconductor structure is a layered structure.

5. The method as set forth in any one of claims 1 to 4 wherein the heatsink is disposed on an ion implanter apparatus during ion implantation, the ion implanter apparatus rotating the heatsink during ion implantation, the method comprising removing the heatsink from the ion implanter apparatus after ions are implanted through the front surface of the semiconductor structure and before measuring the parameter related to the coefficient of friction of the heatsink.

6. The method as set forth in claim 5 wherein the heatsink is positioned on a testing apparatus after ion implantation to measure the parameter related to the coefficient of friction of the heatsink.

7. The method as set forth in any one of claims 1 to 6 wherein the heatsink comprises a substrate and an elastomeric coating disposed on the substrate, wherein the parameter related to the coefficient of friction of the heatsink relates to the coefficient of friction of the elastomeric coating.

8. The method as set forth in claim 7 wherein the substrate is made of aluminum or stainless steel.

9. The method as set forth in claim 7 or claim 8 wherein the elastomeric coating is a silicone elastomer.

10. The method as set forth in any one of claims 1 to 9 wherein the parameter related to the coefficient of friction is related to the static friction of the heatsink.

11. The method as set forth in any one of claims 1 to 9 wherein the parameter related to the coefficient of friction is related to the dynamic friction of the heatsink.

12. The method as set forth in any one of claims 1 to 11 wherein the heatsink comprises a substrate and an elastomeric coating disposed on the substrate and the heatsink is reconditioned by stripping the elastomeric coating from the structure and depositing a second elastomeric coating on the substrate.

13. A method for evaluating suitability of a heatsink for ion implantation of a semiconductor structure, the heatsink comprising a substrate and an elastomeric coating disposed on at least one surface of the substrate, the method comprising:

measuring a parameter related to the coefficient of friction of the elastomeric coating

measuring a parameter related to the coefficient of friction of the heatsink, the parameter related to the coefficient of friction being the sliding angle or break-away force for the heatsink on a surface; and

comparing the parameter to a baseline range;

wherein:

(1) if the parameter falls outside of the baseline range, the heatsink is reconditioned; and

(2) if the parameter falls within the baseline range, the heatsink is used during ion implantation of the semiconductor structure.

14. The method as set forth in claim 13 wherein the substrate is made of aluminum or stainless steel.

15. The method as set forth in claim 14 wherein the elastomeric coating is a silicone elastomer.

16. The method as set forth in any one of claims 13 to 15 wherein the parameter related to the coefficient of friction is related to the static friction of the elastomeric coating.

17. The method as set forth in any one of claims 13 to 15 wherein the parameter related to the coefficient of friction is related to the dynamic friction of the elastomeric coating.

18. The method as set forth in any one of claims 13 to 17 wherein the heatsink is reconditioned by stripping the elastomeric coating from the structure and depositing a second elastomeric coating on the substrate.