CLAIMS

1. A semiconductor wafer mass metrology method comprising:

controlling the temperature of a semiconductor wafer by:

detecting information relating to an incoming temperature of the semiconductor wafer, wherein the information relating to the incoming temperature of the semiconductor wafer is detected before cooling or heating of the semiconductor wafer will be started if cooling or heating of the semiconductor wafer is performed; and

controlling cooling or heating of the semiconductor wafer based on the detected information relating to the incoming temperature of the semiconductor wafer;

wherein controlling the cooling or heating of the semiconductor wafer based on the detected information relating to the incoming temperature of the semiconductor wafer comprises setting a duration of the cooling or heating of the semiconductor wafer, or deciding not to perform the cooling or heating of the semiconductor wafer; and

subsequently loading the semiconductor wafer onto a measurement area (3) of a semiconductor wafer mass metrology apparatus.

2. The method according to claim 1, wherein the information relating to the incoming temperature of the semiconductor wafer is detected using a non-contact measurement method;

wherein, optionally, detecting the information relating to the incoming temperature of the semiconductor wafer comprises detecting radiation emitted by the semiconductor wafer.

3. The method according to any one of the previous claims, wherein the method comprises:

comparing the detected information relating to the incoming temperature of the semiconductor wafer with a threshold value; and

controlling the cooling or heating of the semiconductor wafer based on the result of the comparison; or

based on the result of the comparison, categorising the semiconductor wafer into one of a plurality of categories, and controlling the cooling or heating of the semiconductor wafer based on the result of the categorisation.

4. The method according to any one of the previous claims, wherein controlling the cooling or heating of the semiconductor wafer comprises:

controlling a rate of the cooling or heating of the semiconductor wafer; and/or

controlling a power of a powered cooling or heating device (9) that is used to cool or heat the semiconductor wafer; and/or

controlling a duration of the cooling or heating of the semiconductor wafer to be zero when the incoming temperature of the semiconductor wafer is equal to, or within a predetermined range of, a predetermined temperature; and/or

skipping an available cooling or heating step if a temperature difference between a measured temperature of the semiconductor wafer and a predetermined temperature is less than ±2K, or ±1K, or ±0.5K, or ±0.1K.

5. The method according to any one of the previous claims, wherein the semiconductor wafer is cooled or heated using a powered cooling or heating device (9).

6. The method according to any one of the previous claims, wherein:

the measurement area (3) is inside a measurement chamber (5); and

the temperature of the semiconductor wafer is controlled to be substantially equal to the temperature of the measurement chamber (5), or within ±2K, or ±1K, or ±0.5K, or ±0.1K, of the temperature of the measurement chamber (5).

7. A semiconductor wafer mass metrology apparatus comprising:

a cooling or heating part (9) for cooling or heating a semiconductor wafer;

a controller (12) configured to control cooling or heating of the semiconductor wafer by the cooling or heating part (9) based on detected information relating to an incoming temperature of the semiconductor wafer, wherein the information relating to the incoming temperature of the semiconductor wafer is detected before cooling or heating of the semiconductor wafer will be started if cooling or heating of the semiconductor wafer is performed; and

a measurement area (3);

wherein, to control the cooling or heating of the semiconductor wafer by the cooling or heating part (9) based on the detected information relating to the incoming temperature of the semiconductor wafer, the controller (12) is configured to set a duration of the cooling or heating of the semiconductor wafer by the cooling or heating part (9), or decide not to perform the cooling or heating of the semiconductor wafer by the cooling or heating part (9).

8. The apparatus according to claim 7, wherein the controller (12) is configured to:

compare the detected information relating to the incoming temperature of the semiconductor wafer with a threshold value; and

control the cooling or heating of the semiconductor wafer based on the result of the comparison; or

based on the result of the comparison, categorise the semiconductor wafer into one of a plurality of categories, and control the cooling or heating of the semiconductor wafer based on the result of the categorisation.

9. The apparatus according to claim 7 or 8, wherein the controller (12) is configured to:

control a duration of time that the semiconductor wafer is in contact with the cooling or heating part (9); and/or

control a rate of cooling or heating of the cooling or heating part (9).

10. The apparatus according to any one of claims 7 to 9, wherein the cooling or heating part (9) comprises a powered cooling or heating device (9).

11. The apparatus according to claim 10, wherein the controller is configured to control a power of the powered cooling or heating device.

12. The apparatus according to any one of claims 7 to 11, where the controller (12) is configured to:

control a duration of the cooling or heating of the semiconductor wafer to be zero when the incoming temperature of the semiconductor wafer is equal to, or within a predetermined range of, a predetermined temperature; and/or

skip an available cooling or heating step if a temperature difference between a measured temperature of the semiconductor wafer and a predetermined temperature is less than ±2K, or ±1K, or ±0.5K, or ±0.1K.

13. The apparatus according to any one of claims 7 to 12, wherein the apparatus comprises a detector (10) configured to detect the information relating to the incoming temperature of the semiconductor wafer.

14. A system comprising:

the apparatus according to any one of claims 7 to 12; and

a detector (10) configured to detect the information relating to the incoming temperature of the semiconductor wafer.

15. The apparatus according to claim 13 or the system according to claim 14, wherein the detector (10) comprises an infrared detector (10) for detecting infrared radiation from the semiconductor wafer.