

Parametrisation of the rounding of a wafer made of semiconductor material

Technical field

The present invention relates to methods for determining the rounding of a wafer composed of semiconductor material.

5 Prior art

Wafers composed of semiconductor material are manufactured in a large number of process steps comprising pulling a single-crystal rod from a melt, slicing the crystal into wafers, grinding, edge rounding, polishing and chemical cleaning of the wafers.

10 In this case, edge rounding is usually effected with the aid of an edge rounding grinding disk having circumferential grooves with a specific profile at its edge. In this case, the groove shape corresponds to the negative of the desired edge profile. In this case, the edge of the rotating grinding disk is brought into contact with the edge of the rotating wafer composed of semiconductor material, with the result that the desired edge profile is ground into the edge of the wafer composed of semiconductor material.

15 Besides the actual edge profile, i.e. the shape of the ring-shaped edge region of the wafer in which the thickness of the wafer composed of semiconductor material decreases or tapers continuously in a radial outward direction, special emphasis is increasingly being placed on the geometry of the wafer at the transition between the edge region and the main surface. In this regard, the yield of a production line for
20 manufacturing integrated circuits is dependent, inter alia, on the shape of the transition between the main surface and the tapering edge region of the wafer. It is thus necessary to measure and parameterize this transition in order to be able to specify and optimize the profile of the wafer at the transition from the edge region to the main surface.

25 US 2020/0090923 A1 is directed to a method for polishing the edge region of a wafer composed of semiconductor material, which method comprises determining the angle at the transition from the edge region to the main surface. The method described therein for determining the angle at the transition presupposes that the thickness in

the edge region decreases linearly and is described by a rounding only at the outermost edge. US 2020/0240929 A1 describes a method for evaluating the transition between the edge and the main surface, in which method an angle and a radius along a cross section of a wafer are determined as a characteristic variable for the rounding. US 11,656,186 B2 likewise describes a method for analyzing the edge and the transition region to the main surface. In all these methods, only a small number of points of the tapering edge region in a radial direction are taken into account. As a result, the characteristic figure ascertained by the method is of only limited meaningfulness because the characteristic variable obtained is greatly dependent on the choice of measurement points. As a result, the actual smallest angle/radius or the actual maximum angularity in the transition region between main surface and edge region is not necessarily ascertained. Consequently, the actual geometry of the wafer at the transition between edge region and main surface cannot be characterized and parameterized with sufficient reliability.

Technical problem addressed by the invention and its solution

Consequently, there is a need for a method for more accurately and more reliably determining the rounding at the transition between the main surface and the edge region of a wafer composed of semiconductor material.

The present invention solves the aforementioned problem by providing methods for determining the rounding at the transition between the main surface and the edge region of a wafer composed of semiconductor material. The rounding within the meaning of the present invention relates here to the transition between the main surface and the edge region of a wafer composed of semiconductor material. The edge region is defined here as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases continuously in a radial outward direction. This region is also referred to as facet, and the radial extent of this region as facet length. The adjoining part of the surface of the wafer in a radial inward direction is referred to here as main surface.

In this case, these methods build on known measuring methods for determining the edge profile which are used in the context of process control in the industrial fabrication of wafers composed of semiconductor material. The additional outlay for determining the rounding at the transition between the main surface and the edge region can thus be minimized since there is no need for new measuring apparatuses and additional measurements for determining the rounding. As a result, the method according to the invention for determining the rounding can easily be integrated into industrial fabrication and carried out in the context of process control. Moreover, new characteristic figures for determining the rounding are introduced by the method according to the invention, such that the rounding can be parameterized and specified easily and with high reliability. The method according to the invention is additionally configured in such a way that a large number of data points influence the determination of the characteristic figure. As a result, for various edge profiles it is possible to ascertain a meaningful characteristic figure for the rounding with high accuracy. A characteristic figure within the meaning of the present invention is a figure for quantifying the transition between the edge region and the main surface of a wafer composed of semiconductor material. Angles or radii, in particular, are suitable for quantifying such surface profiles.

The method for determining the rounding of a wafer composed of semiconductor material in accordance with the first aspect of the present invention comprises the following steps:

(i) measuring the height profile of a wafer composed of semiconductor material in a radial direction in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction, wherein the edge region is defined as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases continuously in a radial outward direction;

(ii) defining a radial section comprising a part of the edge region and at least one part of the region adjoining the edge region in the radial inward direction, of the wafer composed of semiconductor material;

(iii) determining an angle φ and optionally an angle θ for determined measurement points P1 of the height profile in the radial section,

wherein the angle φ is formed from the respective determined measurement point P1 as vertex point, and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the vertex point in the radial inward direction and in the radial outward direction, and

wherein the angle θ is obtained from the difference $180^\circ - \varphi$; and
(iv) identifying the smallest angle φ or optionally the largest angle θ in the radial section as a characteristic figure for the rounding.

The method for determining the rounding of a wafer composed of semiconductor material in accordance with the second aspect of the present invention comprises the following steps:

(i) measuring the height profile of a wafer composed of semiconductor material in a radial direction in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction, wherein the edge region is defined as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases continuously in a radial outward direction;

(ii) defining a radial section comprising a part of the edge region and at least one part of the adjoining region in the radial inward direction, of the wafer composed of semiconductor material;

(iii) assigning a radius r to determined measurement points P1 of the height profile in the radial section, wherein the radius r corresponds to the radius of a circle on whose circle line lie the respective determined measurement point P1 and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the respective determined measurement point in the radial inward direction and in the radial outward direction; and

(iv) identifying the smallest radius r in the radial section as a characteristic figure for the rounding.

Brief description of the figures

Figure 1 shows the profile – measured with the aid of a light-section method – of the edge region (1) and of the region (2) adjoining the edge region in a radial inward

direction, of a wafer composed of monocrystalline silicon having a diameter of 300 mm.

Figure 2 shows the height profile – represented as an x-y curve – of a wafer composed of monocrystalline silicon having a diameter of 300 mm in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction, where the x-axis indicates the radial position and the y-axis indicates the axial position.

Figure 3a schematically shows step (iii) of the method in accordance with the first aspect of the present invention, in which an angle φ is assigned to a determined measurement point P1 of the height profile, wherein the angle φ is formed from the respective determined measurement point P1 as vertex point, and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the vertex point P1 in the radial inward direction and in the radial outward direction, respectively. The angle θ results from the difference of $180^\circ - \varphi$.

Figure 3b schematically shows step (iii) of the method in accordance with the second aspect of the present invention, in which a radius r is assigned to a determined measurement point P1 of the height profile, wherein the radius corresponds to the radius of a circle on whose circle line lie the point P1 and two further measurement points P2 and P3 which are arranged at a determined radial distance a from P1 in the radial inward direction and in the radial outward direction, respectively.

Detailed description of the invention

In the method according to the invention for determining the rounding of a wafer composed of semiconductor material in accordance with the first aspect of the present invention, what takes place first of all is the measurement of the height profile of a wafer composed of semiconductor material in a radial direction in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction.

The edge region is defined as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases or tapers continuously in a radial outward direction. In this case, the edge region preferably has a radial extent of not less than 50 μm and not more than 500 μm , preferably not less than 100 μm and not more than 400 μm . That region of the wafer which adjoins the edge region in the radial inward direction and the height profile of which is measured preferably has a radial extent of not less than 50 μm , preferably not less than 100 μm and not more than 3000 μm .

The height profile within the meaning of the present invention describes the progression of the axial extent of a wafer composed of semiconductor material as a function of the radial position. In this case, the height profile can be the height profile of the front side or the height profile of the back side of the wafer composed of semiconductor material. Preferably, the height profile is the height profile of the front side of the wafer composed of semiconductor material. In this case, the axial extent of the wafer composed of semiconductor material is preferably determined by the axial distance between the surface of the front side or back side of the wafer, particularly preferably the front side, and the center line of the wafer. In this case, the radial position is the radial distance from the axis of rotation of the wafer composed of semiconductor material or the radial distance from the wafer edge. An arbitrary radial distance from the wafer midpoint or from the wafer edge can also be set as zero point for the quantification of the radial distance. Each measurement point at the surface of the wafer composed of semiconductor material is thus determined by its radial position (x) and its axial extent (y), such that the height profile can be represented as an x-y curve. This data set can be output as a csv file and the latter can subsequently be processed and evaluated with the aid of a computer program defined beforehand. By way of a compensation calculation, for example fitting or regression, parameters describing the edge shape can be ascertained on the basis of the x-y data set. Such parameters are for example (i) the facet length quantifying the radial extent of the continuously tapering edge region, (ii) the shoulder radius describing the curvature in the outermost edge region, and (iii) the apex length describing the axial extent of the side surface running perpendicularly to the main surface.

In this case, the height profile can be implemented by means of reflection measurement by illumination of the wafer composed of semiconductor material using a laser as light source and detection of the reflected light by means of a detector, for example a photodiode. The height profile can also be ascertained by way of a light-section method. The light-section method is an optical metrology method which makes it possible to measure a height profile along a projected light line. In this case, preferably using a laser or an LED as light source, a shadow projection of the measurement object is generated, and detected by means of an electronic camera or a CCD sensor. In this case, the wafer is preferably illuminated in such a way that a shadow projection of the cross section can be detected. Preferably, the light source is positioned relative to the wafer in such a way that the light from the light source impinges on the wafer perpendicularly to the axis of the wafer. Preferably, the height profile is measured using the light-section method. The reason for this is that the light-section method is also usable for the measurement of polished wafers composed of semiconductor material. The shadow projection reproduces the height profile of a wafer composed of semiconductor material with an accuracy of $\pm 0.1 \mu\text{m}$.

Preference is given to recording not less than 10 measurement points, particularly preferably not less than 20 measurement points, more preferably not less than 100 measurement points and most preferably not less than 1000 measurement points with a varying radial position during the measurement of the height profile of the wafer composed of semiconductor material. In this case, the density of the measurement points is with preference in the range of not less than 2 measurement points, more preferably not less than 5 measurement points, particularly preferably not less than 10 measurement points, each in a section having a radial extent of $1 \mu\text{m}$. The density of the measurement points is preferably not more than 100 measurement points in a section having a radial extent of $1 \mu\text{m}$. The measurement can also comprise a plurality of individual measurements, wherein the semiconductor wafer is rotated about its rotation axis by an angle α between the measurements. In this case, the measurement can consist of x individual measurements between which the wafer composed of semiconductor material is rotated by the angle α in the measuring device, where x and α are preferably chosen so that the product of x (number of individual measurements) and α (angle of rotation in $^\circ$) yields 360° . This makes it

possible to obtain a measurement representative of the entire circumference of the wafer. With preference, $x=4$ and $\alpha=90^\circ$, particularly preferably $x=8$ and $\alpha=45^\circ$, most preferably $x=32$ and $\alpha=11.25^\circ$.

The measured height profile is taken as a basis for defining a radial section

- 5 comprising a part of the edge region and at least one part of the adjoining region in the radial inward direction, of the wafer composed of semiconductor material. That part of the edge region which is comprised by the radial section preferably has a radial extent of not more than 30%, particularly preferably not more than 20%, of the radial extent of the entire edge region. This limitation ensures that the greatly curved region
- 10 of the edge profile is not taken into account in the methods according to the invention and the characteristic figure ascertained actually relates to the transition from the edge region to the main surface, and possible smaller angles φ , larger angles θ or larger radii r of the edge profile in the part located radially further outward do not falsify the characteristic figure for the rounding at the transition to the main surface. By
- 15 means of a limitation of that part of the edge region which is selected for the radial section in step (ii) to not more than 20% of the radial extent of the entire edge region, this is ensured for a large number of edge profiles.

In this case, that part of the edge region which is comprised by the radial section is the radially inward part of the edge region. The fact that the defined radial section

- 20 excludes a large part of the edge region and in particular of the outer part of the edge region makes it possible to ensure that the great curvature of the edge profile does not influence the further evaluation and the rounding value ascertained on the basis of the defined radial section actually relates to the transition region between edge and main surface.

- 25 Preferably, the selected radial section has a radial extent of not less than 200 μm , preferably not less than 500 μm , most preferably not less than 1000 μm and not more than 1500 μm . In this case, the radial section is preferably selected in such a way that that part of the edge region which is comprised by the radial section is not less than 50 μm and not more than 200 μm .

In accordance with the first aspect of the present invention, after the radial section has been defined, an angle is assigned to a determined measurement point of the height profile in the radial section. For this purpose, determined measurement points of the height profile in the radial section are selected, to which measurement points an angle is intended to be assigned. In this case, either each measurement point of the height profile in the radial section can be assigned an angle or only some of the measurement points of the height profile in the radial section can be assigned an angle. The measurement points to which an angle is assigned are referred to here as determined measurement points. Preferably, an angle is assigned to at least 10 determined measurement points, particularly preferably at least 20 measurement points and most preferably at least 50 measurement points. Preferably, not less than 5 measurement points to which an angle is assigned in each case lie in that part of the edge region which is comprised by the radial section and in the region adjoining it in the radial inward direction.

The determined measurement points of the height profile in the radial section to which an angle is assigned can be for example all measurement points in the radial section or measurement points arranged at a defined radial distance along the height profile. The “*defined radial distance*” thus describes the distance between the determined measurement points to which an angle is assigned. The defined radial distance between the measurement points to which an angle is assigned is preferably not less than 10 μm and not more than 200 μm , more preferably not less than 20 μm and not more than 100 μm .

In this case, the determined measurement points are assigned an angle φ and/or an angle θ . The angle φ is formed from the respective determined measurement point P1 as vertex point, and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the vertex point P1 in the radial inward direction (P3) and in the radial outward direction (P2), respectively. This is illustrated schematically in figure 3a. The two legs of the angle are defined in each case by the vertex point P1 and one of the two further measurement points P2 and P3. The expression “*determined radial distance*” thus relates to the radial distances a between a measurement point used as vertex point and two further measurement

points from which the angle is formed. The determined radial distance a is preferably not less than $10\text{ }\mu\text{m}$ and not more than $100\text{ }\mu\text{m}$, more preferably not less than $20\text{ }\mu\text{m}$ and not more than $80\text{ }\mu\text{m}$, particularly preferably not less than $30\text{ }\mu\text{m}$ and not more than $60\text{ }\mu\text{m}$. In this case, the angle φ always relates to the smallest angle formed by the three measurement points, and so the angle never has a value of more than 180° . The angle θ can be obtained – on the basis of the angle φ – from the difference $180^\circ - \varphi$.

In one embodiment, the angle is formed from a determined measurement point as vertex point and the two adjacent determined measurement points in the radial inward direction and in the radial outward direction, respectively. In this case, the defined radial distance and the determined radial distance are identical.

Since the density of the measurement points in height measurements usually decreases in the radial inward direction, both (i) the defined radial distance between the determined measurement points and (ii) the determined radial distance between a vertex point and the two further points which define the legs of the angle can vary in the radial section. Preferably, the determined radial distance varies in the radial section by not more than $10\text{ }\mu\text{m}$, particularly preferably not more than $6\text{ }\mu\text{m}$, most preferably not more than $2\text{ }\mu\text{m}$. Accordingly, the determined radial distance is subject to an accuracy of $\pm 5\text{ }\mu\text{m}$, preferably $\pm 3\text{ }\mu\text{m}$, particularly preferably $\pm 1\text{ }\mu\text{m}$. Preferably, the defined radial distance varies in the radial section by not more than $10\text{ }\mu\text{m}$, particularly preferably not more than $6\text{ }\mu\text{m}$, most preferably not more than $2\text{ }\mu\text{m}$. Accordingly, the defined radial distance is subject to an accuracy of $\pm 5\text{ }\mu\text{m}$, preferably $\pm 3\text{ }\mu\text{m}$, particularly preferably $\pm 1\text{ }\mu\text{m}$.

Once each determined measurement point of the height profile in the radial section has been assigned an angle φ or θ , the smallest angle φ all the largest angle θ in the radial section is identified. The smallest angle φ or the largest angle θ can subsequently be used as a characteristic figure for the rounding. The angles φ and θ are equally suitable as a characteristic figure as long as the respective angle was determined for each determined measurement point.

The method in accordance with the second aspect of the present invention differs from the method in accordance with the first aspect of the present invention in that the assignment of a radius r to determined measurement points of the height profile in the radial section is effected instead of the assignment of an angle. This is illustrated schematically in figure 3b. For this purpose, determined measurement points P1 of the height profile in the radial section are selected, to which measurement points a radius is intended to be assigned. The measurement points to which a radius r is assigned are referred to here as determined measurement points P1. In this case, the radius r corresponds to the radius of a circle on whose circle line lie the respective determined measurement point P1 and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the respective determined measurement point P1 in the radial inward direction (P3) and in the radial outward direction (P2), respectively.

The determined measurement points of the height profile in the radial section to which a radius is assigned can be for example measurement points arranged at a defined radial distance along the height profile. The “*defined radial distance*” thus describes the distance between the determined measurement points to which a radius is assigned. The defined radial distance between the measurement points to which a radius is assigned is preferably not more than 100 μm , more preferably not more than 50 μm , even more preferably not more than 25 μm . If the defined radial distance lies in this range, the ascertained characteristic figure for the rounding is meaningful and significant. If the defined radial distance does not exceed 25 μm , in particular if the defined radial distance does not exceed 10 μm , the meaningfulness and accuracy of the ascertained characteristic figure for the rounding can be increased further. The defined radial distance between the measurement points to which a radius is assigned is preferably not less than 20 nm, more preferably not less than 50 nm. In principle, the lower limit of the defined radial distance is dependent on the measurement point density. If the defined radial distance is not less than 20 nm, more preferably not less than 50 nm, the measurement point density attained in the context of process control for determining the edge geometry suffices to be able to carry out the methods according to the invention. Consequently, the methods according to the invention in accordance with the first and second aspects can easily be integrated into the process

control, without additional measurements being required. In a further embodiment, the defined radial distance is therefore preferably not less than 50 nm and not more than 10 μm .

The expression "*determined radial distance*" relates to the radial distances a between
5 a determined measurement point and the two further measurement points used for determining the radius. The determined radial distance a is preferably not less than 10 μm and not more than 100 μm , more preferably not less than 20 μm and not more than 80 μm , particularly preferably not less than 30 μm and not more than 60 μm .

Preferably, a radius is assigned to all measurement points in the radial section, such
10 that each measurement point of the height profile is a determined measurement point. However, it is also possible for a radius to be assigned to only some of the measurement points. Preferably, there are present at least 10 determined measurement points, particularly preferably at least 20 determined measurement points and most preferably at least 50 determined measurement points to which a
15 radius is assigned. Preferably, not less than 5 determined measurement points in each case lie in that part of the edge region which is comprised by the radial section and in the region adjoining it in the radial inward direction. The smallest radius in the radial section is subsequently identified. The smallest radius can then be used as a characteristic figure for the rounding.

20 The methods according to the invention in accordance with the first aspect or the second aspect of the present invention can be carried out in an automated manner. According to DIN V 19233, automation is understood to mean equipping a device so that it operates as intended in full or in part without human involvement, apart from the prior planning, design and programming by a human. Accordingly, an automated
25 method within the meaning of the present invention is a method which proceeds as intended in full or in part without human involvement. Steps (ii) to (iv) of the method according to the invention in accordance with the first aspect or the second aspect of the present invention can be carried out with the aid of a previously defined computer program on a computer, the computer program being based for example on a Python

or Java software script. Steps (ii) to (iv) can thus be carried out in an automated manner.

The methods according to the invention in accordance with the first aspect or the second aspect of the present invention can also be carried out in combination. For this purpose, it is possible to carry out firstly the measurement of the height profile in step (i) and the definition of the radial section in step (ii) for both methods jointly and afterward in each case steps (iii) to (iv) for ascertaining the two characteristic figures.

Description of one exemplary embodiment according to the invention

The profile of the edge region and of the region adjoining it of a polished wafer composed of monocrystalline silicon having a nominal diameter of 300 mm was measured by means of a light-section method. The measured profile is illustrated in figure 1. The measurement took place on a measuring device for determining the edge profile from the manufacturer Kobelco. A total of 12,200 data points were recorded over a radial region with a radial extent of 3 mm. The density of the measurement points gradually decreased over the measurement region in the radial inward direction. In this regard, approximately 50 measurement points per micrometer were recorded at the outer wafer edge, while only approximately 2 measurement points per micrometer were recorded at the end of the measurement region facing toward the wafer center.

The measured profile of the wafer is represented as an x-y curve in figure 2, where the x-axis indicates the radial position and the y-axis indicates the axial position.

The measurement points, which can be stored electronically in the form of an x-y data set as a csv file, are preferably evaluated by software, for example Python or Java. The csv file is read into said software and with the aid of the latter, in line with the methods according to the invention, characteristic figures for the rounding are determined automatically in accordance with the first aspect and the second aspect of the present invention. The following steps are carried out here on the basis of the csv file. The step carried out first of all was that of defining a radial section containing a part of the measured edge region and a part of the measured region adjoining the

edge region in the radial inward direction, of the wafer. In this case, the selected section had a radial extent of 200 μm and was selected such that the part of the edge region used for the evaluation comprises not more than 30% of the edge region, i.e. of the facet length. Afterward, an angle and a radius were assigned to each

5 measurement point in the selected radial section. In order to determine the angle θ and the radius r of a determined measurement point, two adjacent measurement points at the distance a of 40 μm relative to the respective determined measurement point were used in this case. Firstly, the angle φ was defined by the three

10 measurement points, where the middle measurement point represented the angle vertex. Then, the angle θ was obtained from the difference $180^\circ - \varphi$ and assigned to the middle measurement point. In order to determine the radius, firstly a circle on whose circle line the respective three measurement points lay was identified and subsequently the radius of the circle was determined. An angle θ and a radius r were thus assigned to each measurement point in the selected radial section. The largest

15 angle θ and the smallest radius r in the defined radial section were subsequently identified and used as characteristic figures for the rounding. The largest angle θ in the radial section was 13.9° and the smallest radius r in the radial section was 172.4 μm .

Patent claims

1. A method for determining the rounding of a wafer composed of semiconductor material, comprising the following steps in this order:

5 (i) measuring the height profile of a wafer composed of semiconductor material in a radial direction in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction, wherein the edge region is defined as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases continuously in a radial outward direction;

10 (ii) defining a radial section comprising a part of the edge region and at least one part of the region adjoining the edge region in the radial inward direction, of the wafer composed of semiconductor material;

(iii) determining an angle φ and optionally an angle θ for determined measurement points P1 of the height profile in the radial section,

15 wherein the angle φ is formed from the respective determined measurement point P1 as vertex point, and two further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the vertex point in the radial inward direction and in the radial outward direction, and

20 wherein the angle θ is obtained from the difference $180^\circ - \varphi$; and

(iv) identifying the smallest angle φ or optionally the largest angle θ in the radial section as a characteristic figure for the rounding.

2. A method for determining the rounding of a wafer composed of semiconductor material, comprising the following steps in this order:

25 (i) measuring the height profile of a wafer composed of semiconductor material in a radial direction in the edge region of said wafer and in a region adjoining the edge region in a radial inward direction, wherein the edge region is defined as a ring-shaped region at the outer edge of the wafer in which the thickness of the wafer decreases continuously in a radial outward direction;

30 (ii) defining a radial section comprising a part of the edge region and at least one part of the adjoining region in the radial inward direction, of the wafer composed of semiconductor material;

35 (iii) assigning a radius r to determined measurement points P1 of the height profile in the radial section, wherein the radius r corresponds to the radius of a circle on whose circle line lie the respective determined measurement point P1 and two

further measurement points P2 and P3 of the height profile which are arranged at a determined radial distance a from the respective determined measurement point in the radial inward direction and in the radial outward direction; and

(iv) identifying the smallest radius r in the radial section as a characteristic figure for the rounding.

3. The method for determining the rounding of a wafer composed of semiconductor material as claimed in claim 1 or 2, characterized in that that part of the edge region which is comprised by the radial section and that part of the adjoining region in the radial inward direction which is comprised by the radial section, independently of one another, each comprise at least 5 measurement points.

4. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 3, characterized in that the radial section has a radial extent of not less than 100 μm .

5. The method for determining the rounding of a wafer composed of semiconductor material as claimed in claim 4, characterized in that the radial section has a radial extent of not less than 200 μm and not more than 500 μm .

6. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 5, characterized in that each of the two parts of the radial section has a radial extent of not less than 50 μm .

7. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 6, characterized in that that part of the edge region which is comprised by the radial section preferably has a radial extent of not more than 30%, particularly preferably not more than 20%, of the radial extent of the entire edge region of the wafer composed of semiconductor material.

8. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 7, characterized in that the determined radial distance a is not less than 10 μm and not more than 100 μm , preferably not less than 20 μm and not more than 80 μm , particularly preferably not less than 30 μm and not more than 60 μm .

9. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 8, characterized in that the height profile of the front side of the wafer is measured.

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10. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 9, characterized in that the measurement of the height profile in step (i) is effected by means of a light-section method or a reflection measurement.

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11. The method for determining the rounding of a wafer composed of semiconductor material as claimed in any of claims 1 to 10, characterized in that steps (ii) to (iv) are carried out automatically with the aid of software.