Appeal decision

Appeal No. 2016-9365

Germany
Appellant SILTRONIC AG

Osaka, Japan
Patent Attorney FUKAMI PATENT OFFICE, P.C.

The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2014-88956, titled "Silicon single crystal produced by float zone method, and silicon substrate," [the application published on Jul. 24, 2014: Japanese Unexamined Patent Application Publication No. 2014-133702] has resulted in the following appeal decision:

Conclusion

The appeal of the case was groundless.

Reason

No. 1 History of the procedures

The present application filed on April 23, 2014 is a divisional application based on Japanese Patent Application No. 2009-136116, which is a divisional application filed on June 5, 2009 based on Japanese Patent Application No. 2002-221342 filed on July 30, 2002 (Heisei 14) (priority Claim under the Paris Convention: August 2, 2001, Germany). A notification of reasons for refusal dated March 30, 2015 was issued, a written opinion and a written amendment dated September 7, 2015 were submitted, and a decision of refusal dated Feb. 17, 2016 was made. The appeal against the decision of refusal was filed on June 23, 2016. A notification of reasons for refusal dated April 17, 2017 by the body was issued, and a written opinion dated August 17, 2017 was submitted. Then, an interrogation dated September 5, 2017 was issued by the body and a written reply dated December 11, 2017 was submitted.

No. 2 The Invention

The inventions subject to Claims 1 and 2 of the application are specified according to Claims 1 and 2 of the scope of claims respectively described in the written amendment dated September 7, 2015. The invention subject to Claim 1, which is an independent claim (hereinafter, referred to as "the Invention") is as follows.

"[Claim 1]

A silicon single crystal produced from polysilicon rod material by crucible-free float zone method, characterized by having a diameter of at least 200 mm over a length of at least 200 mm, and being free from dislocation in a range of the length."

No. 3 Reasons for refusal notified by the body

The reasons for refusal dated April 17, 2017 notified by the body are summarized bellow.

Reason 1 (Regarding Article 36(6)(ii) of the Patent Act)

Claim 1 refers to an invention of a product of "a single crystal." However, since the statement of "produced from polysilicon rod material by crucible-free float zone method" of Claim 1 may contain components of time series and technical features or conditions relating to manufacturing, it should be said that Claim 1 refers to a manufacturing process of the product subscribed there.

It is appropriate to construe that when a claim of a patent for an invention of a product recites the manufacturing process of the product should be held to meet the requirement that the claimed invention is clear as prescribed in Article 36(6)(ii) of the Patent Act, only if there are circumstances where it was impossible or utterly impractical to directly define the product subject to the invention by means of its structure or characteristics at the time of the filing of application (such circumstances are hereinafter referred to as "impossible/impractical circumstances") (Second petty bench of Supreme court decision, June 5, 2015: case No. 2012(Ju)1204 and 2012(Ju)2658).

However, the description and the like of the application does not refer to impossible/impractical circumstances, and it cannot be said that impossible/impractical circumstances obviously exist in the Invention to a person skilled in the art either.

Therefore, the inventions subject to Claim 1 and Claim 2 citing Claim 1 are not clear. Accordingly, the statements of the scope of claims do not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act.

Reason 2 (Regarding Article 29(1)(iii) of the Patent Act)

A silicon single crystal having a diameter of at least 200 mm over a length of at least 200 mm, and being free from dislocation in a range of the length is a single crystal had already been well-known before the priority date of the present application (for example, refer to examples and the like disclosed in Japanese Unexamined Patent Application Publication No. H9-183686 (hereinafter, referred to as "Cited Document 1"), Japanese Unexamined Patent Application Publication No. H10-95689 (hereinafter, referred to as "Cited Document 2"), Japanese Unexamined Patent Application Publication No. 2001-10659 (hereinafter, referred to as "Cited Document 3"), and Japanese Unexamined Patent Application Publication No. 2001-199789 (hereinafter, referred to as "Cited Document 4")). Thus, as for "a single crystal (product)," it can be said that a single crystal of the Invention is identical to such well-known single crystals. In addition, a sliced silicon substrate from a single crystal had been well-known before the priority date of the application, too.

Accordingly, the inventions subject to Claim 1 and Claim 2 citing Claim 1 fall under Article 29(1)(iii) of the Patent Act, and the Appellant should not be granted a patent.

In the notice of reasons for refusal issued by the body, it is mentioned that a single crystal produced by the float zone method according to the Inventions may differ from all above-mentioned well-known single crystals produced by Czochralski method since a single crystal produced by Czochralski method may contain impurities (contaminants) from a crucible. It is also mentioned that the body finds no difference between them from the viewpoint of impurity, taking into consideration the claims, description and drawings of the application.

Reason 3 Regarding Article 36(4)(i) of the Patent Act

(Omitted)

No. 4 Summary of the written opinion, the interrogation, and the written reply
1 Summary of the written opinion dated August 17, 2017
(1) Regarding Reason 1

With respect to Reason 1, in the written opinion dated August 17, 2017 (hereinafter, referred to as "the written opinion"), the Appellant stated that "It can be said that a reasonable approach to distinguish an FZ silicon single crystal of a length of at least 200 mm from a CZ silicon single crystal of the same length is to determine the amount of oxygen thereof. ... It can be said that an FZ silicon single crystal has the amount of oxygen remarkably smaller than a CZ silicon single crystal has. ... .

At the time of the filing of the application, it was also known that an FZ silicon single crystal could be deliberately doped with oxygen. However, it turned out that known methods of doping an FZ silicon single crystal with oxygen did not work on a silicon single crystal having a diameter of at least 200 mm. ... . Therefore, although it cannot be said that it is desirable to dope an FZ silicon single crystal with oxygen deliberately, there were no technical idea at the time of filing of the application for modifying the amount of oxygen of a larger FZ silicon single crystal having a diameter of at least 200 mm and a length of at least 200 mm as described in the Claim 1 in order to distinguish it from a CZ silicon single crystal. Besides, there was no standard method to determine the amount of oxygen in the above-mentioned larger FZ silicon single crystal which is appropriate to distinguish it from a CZ silicon single crystal on the basis of the amount of oxygen. Therefore, it can be said that, at the time of filing of the application, it was impractical to directly specify a silicon single crystal of the Invention by means of the amount of oxygen." (underlines are given by the body, and the same applies hereafter)

That is, the Appellant alleges that there are impossible/impractical circumstances for defining the Invention of a single crystal (product) subject to Claim 1 by means of a manufacturing process because there had been no standard method that determined the amount of oxygen contained in a larger FZ silicon single crystal and managed to distinguish it from a CZ silicon single crystal although a reasonable approach for the distinction is to identify the amount of oxygen.

(2) Regarding reason 2

With respect to reason 2, in the written opinion, the Appellant alleges that all single crystals described in the Cited Documents 1-4 are manufactured with a crucible, and it can be said that the amount of oxygen thereof is obviously different from that of a silicon single crystal subject to the Invention. Thus, the inventions subject to Claims 1 and 2 are different from the single crystals above, which had been well-known, and do not fall under Article 29(1)(iii) of the Patent Act.

2 Summary of the interrogation and the written reply
(1) Summary of the interrogation

The interrogation by the body is as follows.

"The amount of oxygen contained in a silicon single crystal could have been determined by means of infrared absorption spectrometry before the priority date of the application (for example, refer to Naohisa Inoue, et al. 'Behavior of oxygen in silicon

crystal', Tetsu-to-Hagane, 73 (1987) No. 8, page 32, left column, lines 7-8). Besides, JEIDA (Japan Electronic Industry Development Association) had standardized the measurement method as one of JEIDA standards before the priority date of the application: 'Standard method of measurement of an interstitial oxygen atom density in silicon by infrared absorption', JEIDA-61-2000 (published by Japan Electronic Industry Development Association, Aug., 2000) (hereinafter, referred to as the 'written standard'). In lines 12-13 of page 1 of the above-mentioned written standard, it is stated that 'This measurement method is a method to determine a density of interstitial oxygen in a silicon single crystal thin leaf or in a commercial silicon wafer by means of absorption coefficient measurement using infrared spectroscopy.', and it is stated, in line 26 of page 8, that the wafer 'has a diameter of 100-300 mm and thickness of 500-800 μm,' and thus it is described that a large-sized silicon single crystal of at least 200 mm is measured.

Accordingly, it is obvious that there had been a standard method to determine the amount of oxygen contained in a larger silicon single crystal of at least 200 mm before the priority date of the application, even if the silicon single crystal was produced by any kind of FZ method, CZ method, or even other methods."

Then, the body notified body's belief that there were no impossible/impractical circumstances as alleged by the Appellant and requested a further allegation.

(2) Summary of the written reply

The Appellant's reply is as follows.

"The applicant does not intend to argue against the existence itself of the JEIDA standard, however, according to the state of the art on the time of the application filing there had existed no larger silicon single crystal produced by FZ method and being free from dislocation as specified in Claim 1 (hereinafter, referred to as a "FZ silicon single crystal").

Determination of the amount of oxygen alleged in the written opinion dated August 17, 2017 was mentioned as one possible method that seems to be reasonable for distinguishing a silicon single crystal produced by CZ method(hereinafter, referred to as "CZ silicon single crystal") from an FZ silicon single crystal was exampled. Meanwhile, Claim 1 does not define "the amount of oxygen."

As alleged in the above written opinion, although the applicant of the application has already known that 'a method to dope deliberately an FZ silicon single crystal with oxygen did not work on a silicon single crystal having a diameter of 200 mm or more,' the applicant has recognized that a person skilled in the art other than the applicant of the application did not know it.

As a result, even if the measurement method based on the above-mentioned JEIDA standard existed, so long as the fact that ‘a method to dope deliberately an FZ silicon single crystal with oxygen does not work on a silicon single crystal of 200 mm or more' was not known to persons other than the applicant of the application as for the state of the art on the priority date of the application, it can be said that, persons skilled in the art other than the applicant of the application recognized that it was still possible to dope deliberately even an FZ silicon single crystal of 200 mm or more with oxygen.

Assuming that it is possible to dope deliberately an FZ silicon single crystal of 200 mm or more with oxygen, and that the amount of oxygen contained therein is identical with that of a CZ silicon single crystal, it is not possible to distinguish the CZ

silicon single crystal from the FZ silicon single crystal by determining the amount of oxygen only. Then, in the state of the art at the time of the priority date of the application, a person skilled in the art must have recognized that it was impossible to distinguish a CZ silicon single crystal from an FZ silicon single crystal by determining the amount of oxygen contained therein.

In view of such state of the art at the time as mentioned above, even if such a technique mentioned by the body existed at the time of the priority date of the present application, it can be said that for a person skilled in the art it was impossible and impractical technique to distinguish a CZ silicon single crystal from an FZ silicon single crystal by determining the amount of oxygen contained therein at the time of the priority date of the application." (The body added the underlines.).

No. 5 Judgment

1 Regarding reason 1

Regarding the reason 1 reciting that the statements of the scope of claims do not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act since a manufacturing process of a product is described in the scope of claims referring to the invention of that product, the Appellant has made allegation about impossible/impractical circumstances in the above written opinion and the written reply. Therefore, the allegation will be discussed below.

(1) Regarding determination of the amount of oxygen contained in a silicon single crystal

As mentioned in the above interrogation, it had been common to determine the amount of oxygen contained in a silicon single crystal by means of infrared absorption spectrometry before the priority date of the present application. And, the measurement method is applied to any silicon single crystal irrespective of a manufacturing process and the size, and it had been standardized before the priority date of the present application (JEIDA-61-2000, Aug., 2000: published by Japan Electronic Industry Development Association) (hereinafter, referred to as "Standard measurement method"). Existence of this standard measurement method of measuring a contained oxygen amount of a silicon single crystal by infrared absorption spectrometry is acknowledged also by the Appellant (refer to the underlined portion of the above written reply).

Further, the Appellant has stated in the above-mentioned written opinion that it is a reasonable approach for distinguishing an FZ silicon single crystal of a length of at least 200 mm and a CZ silicon single crystal of the same length to determine the amount of oxygen thereof since an FZ silicon single crystal has the amount of oxygen remarkably smaller than that of a CZ silicon single crystal.

In light of the above Appellant's allegation, it is obvious that an FZ silicon single crystal and a CZ silicon single crystal can be distinguished by determining the amount of oxygen contained in a ‘silicon single crystal' subject to the Invention while the amount of oxygen thereof can be determined by means of the above standard measurement method. Even if, as the Appellant alleged, there had been no silicon single crystal having a diameter of at least 200 mm throughout a length of at least 200 mm and being free from dislocation in the range of this length by the "Float Zone method," there is no technical ground to prove that it was impossible to determine the amount of

oxygen contained in a silicon single crystal having a diameter of at least 200 mm throughout a length of at least 200 mm and being free from dislocation in the range of this length. In addition, the Appellant has not alleged a technical ground that the above-mentioned standard measurement method cannot determine the amount of oxygen contained therein.

Accordingly, it cannot be said that there are impossible/impractical circumstance in specifying a silicon single crystal in terms of a manufacturing process as "produced from polysilicon rod material by crucible-free float zone method despite the fact that a silicon single crystal having a diameter of at least 200 mm throughout a length of at least 200 mm and being free from dislocation in the range of this length can be specified by determining the amount of oxygen contained therein and, as a result, a silicon single crystal produced by other manufacturing processes (such as CZ method) can be distinguished."

(2) Regarding oxygen doping of FZ silicon single crystal

A The allegations regarding oxygen doping in the written opinion and the written reply of the Appellant are summarized bellow.

Although the Appellant had already known that the known method for doping deliberately an FZ silicon single crystal with oxygen did not work on a silicon single crystal having a diameter of at least 200 mm, other persons skilled in the art had not known that. Therefore, assuming that there existed an FZ silicon single crystal having a diameter of at least 200 mm, a person skilled in the art could deliberately dope the FZ silicon single crystal with oxygen, then, a person skilled in the art recognized that the amount of oxygen contained in FZ silicon single crystal was identical with that of a silicon single crystal produced by other manufacturing process (CZ method). Consequently, it can be said that a person skilled in the art recognized that a CZ silicon single crystal and the FZ silicon single crystal could not be distinguished by determining the amount of oxygen contained therein. Consequently, it should be said that a person skilled in the art would not specify a silicon single crystal in terms of the amount of oxygen. Thus, there are impossible/impractical circumstance regarding definition in terms of the amount of oxygen contained therein.

B It is understood that the above allegation is that there are impossible/impractical circumstances because a person skilled in the art does not recognize that a CZ silicon single crystal and an FZ silicon single crystal "doped with oxygen" can be distinguished in terms of the amount of oxygen. The body admits that, in such a case, doping the FZ silicon single crystal is required. However, in the Invention, regarding a silcon single crystal, a silicon single crystal "doped with oxygen" is not specified. Moreover, there is no reference to oxygen doping in the description of the application. Therefore, even in the light of the description of the application, it is not understood that a silicon single crystal subject to the Invention is doped with oxygen.

Furthermore, even if the technology for oxygen doping on the occasion of producing a silicon single crystal produced by FZ method was well-known as disclosed in Japanese Unexamined Patent Application Publication No. S60-90899 presented by the Appellant in the written opinion, an example described in the description of the present application is not doped with oxygen. Thus, it is obvious that oxygen doping is not carried out in the Invention even from the viewpoint of the above-mentioned well-

known art.
"[Examples]
[0023]

When a silicon single crystal having a diameter of 204 mm was pulled up, it was dislocation free in a length longer than 200 mm. In a preparation period, a polycrystalline raw material rod having a diameter of 115 mm was attached into the container. In a similar fashion, in the container, a seed crystal, a high-frequency coil constituted as a flat coil (pancake coil), and a reflector for a single crystal were prepared. In a pumping period, the container was evacuated first, and, next, was filled with argon (1.65 bar) and nitrogen (0.3 volume%). In succession to this, a mixture product composed of argon and nitrogen was made to pass through the container. The flow volumes were 4200 Nl/h (argon) and 13 Nl/h (nitrogen). During a preheating period, the lower end face side of the raw material rod was heated using a preheating ring first, and, in succession to this, by use of a high-frequency coil. After a molten droplet portion had been formed in the seed crystal, this seed crystal was brought into contact with the raw material rod, pulling down of a single crystal was started, and, on this occasion, a diameter of the single crystal was constantly enlarged, first. For the purpose of starting such cone portion formation period, the single crystal was rotated undirectionally. Before pulling up the cylindrical shape portion of the single crystal, switching to a reverse rotation according to the present invention was performed. The pulling down speed in the case of pulling down the cylindrical shape portion of the single crystal was 1.8 mm/min. In the final period of the pulling down step, the diameter of the single crystal was reduced to form a tail cone, and the single crystal was taken out from the container after having been cooled."

Accordingly, the Appellant's allegation that the Invention requires "doping with oxygen" cannot be said to be correct since a silicon single crystal subject to the Invention is not one deliberately doped with oxygen. Therefore, the body cannot admit that there are impossible/impractical circumstances on the basis of he above-mentioned Appellant's allegation.

(3) Summary

Although the Appellant alleges that the Invention is specified by a manufacturing process of the statement "produced from polysilicon rod material by crucible-free float zone methods" since there are impossible/impractical circumstance where the Invention cannot be specified in terms of the amount oxygen. However, the body cannot admit that any of the allegations can be impossible/impractical circumstances as mentioned in the above (1) and (2).

Therefore, there are no impossible/impractical circumstance regarding specifying a product in question where it was impossible or utterly impractical to directly define the product subject to the Invention by means of its structure or characteristics at the time of the filing of application (the priority date of the present application). Accordingly, in accordance with Second petty bench of Supreme Court decision, June 5, 2015: case No. 2012 (Ju)1204 and 2012(Ju)2658), it cannot be said that the statements of the scope of claims conform to the requirement of "definiteness of the invention" stipulated in Article 36(6)(ii) of the Patent Act.

Therefore, the Invention is not clear, and thus the statements of the scope of

claims do not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act.

2 Regarding Reason 2

As mentioned in the paragraph of "Regarding oxygen doping of FZ silicon single crystal (1.(2))", the Appellant's allegation that the Invention requires "doping with oxygen" is not based on the Invention or the description of the application and thus not legitimate. However, an examination is made below in case the Appellant's allegation is approved and a single crystal subject to the Invention includes a single crystal "doped with oxygen."

(1) Regarding a well-known invention

A Matters described in the Cited Documents

In the above-mentioned Cited Documents 1-4, the following matters are described. Note that underlines were given by the body.

(A) Cited Document 1

(1A) "[Examples] ...

[0038]

The specific pulling up process is as follows. First, a silicon polycrystalline raw material of 210 kg was inputted in the quartz crucible 5, heated by the heater 7 to be melted, and the silicon melt 15 was obtained in the quartz crucible 5. The seed crystal 16 suspended from the upper side was dipped into the silicon melt 15, then pulled up at a predetermined speed while rotating the seed crystal 16, and the single crystal rod 18 of a diameter of 300 mm was made to grow in front of the seed crystal 16. As the pulling up weight of the single crystal rod 18 increases, the volume of the silicon melt 15 is reduced and the surface position of the silicon melt 15 changes relative to the heater 7. Therefore, in order to keep the temperature at the position of the interfacial surface between the single crystal rod 18 and the silicon melt 15 at the solidification temperature, the quartz crucible 5 and the graphite crucible 6 were raised by desired distances by calculation linked to a single crystal weight."

(1B) "[0042]

[Advantageous Effects of Invention]

As is clear from the above description, it is possible to prevent deposition and adhesion of silicon oxide to the upper end of a quartz crucible due to the present invention, and thus, by a high-yield single crystal process, a dislocation-free single crystal can be obtained."

(B) Cited Document 2

(2A) "[Examples] Hereinafter, examples of a single crystal growth method will be described.

[0047]

Pulling up crystal	: a silicon single crystal of a diameter of 300 mm
Raw material charge-in quantity	: high purity polysilicon 150 kg
Dissolution method	: resistance heating method
Furnace atmosphere	: 10 Torr Ar (argon) 50 liters/min
Quartz crucible size	: diameter 650 mm, height 400 mm
Heater size	: inside diameter 700 mm, outside diameter 740 mm,

height 500 mm
Heat reserving cover size : inside diameter 800 mm, outside diameter 950 mm
Size of main chamber 5a : diameter 1000 mm, height 1200 mm
Rotational speed of pulling shaft 3 : 10 rpm
Rotational speed of crucible 1 : 8 rpm
Length of crystal straight-body part 8a : 650 mm"

(2B) "[0049]

As is obvious from this Figure, the crystal 8 having the tail 8b having small variations in crystal diameter and a smooth shape was able to be obtained in a state being dislocation free in the whole area."

(C) Cited Document 3

(3A) "[Examples] ...

[0048]

To the silicon melt 3 that is in the crucible 1a and has been heated and melted by the heater 4, a seed crystal attached to the seed chuck 6 in the tip of the pulling shaft 5 is made to contact, and pulled up while making the melt be solidified to grow at the tip of the seed crystal, and the single crystal 7 is made to grow. The crucibles 1a and 1b can be rotated by the support shaft 2, and also the single crystal is rotated by the pulling shaft 5. In order to make a crystal of the single crystal dislocation free, a seed necking process to make the single crystal grow in a state of its diameter being thinner than the initial diameter at the time of adhering to the seed crystal is carried out first, and, next, a shoulder part is made to be formed and, further, shoulder change is performed to make the single crystal be of a constant body diameter.

[0049]

The single crystal was made to be of the target diameter of 210 mm, and body length of 1000 mm. In this case, a pulling up speed was made to be 0.6 mm/min at the time point when the body length had reached 300 mm, and, after that, was lowered gradually in a nearly linear fashion according to a pulling up length, and was made to be 0.3 mm/min at the time when the body length has reached 600 mm. FIG. 7 shows a result of measurement of temperature T at the center part of the single crystal during the pulling up and a vertical-direction temperature gradient ratio Gc/Gp, and it was a result sufficiency satisfying the relation of the expression (1) and expression (2) indicated by broken lines." (In the original text, (1) and (2) are circled numbers)

(D) Cited Document 4

(4A) "[Embodiments of the invention] ...

[0013]

Here, when silicon single crystals having a diameter of the straight body part of 200 mm and a weight of 150 kg were produced by the aforementioned manufacturing process of a silicon single crystal using seeds of diameters of 5 mm, 10 mm, and 15 mm, dislocation-free silicon single crystals were obtained in any of the cases.

However, although, when a seed diameter becomes larger, parallel-growth just under the seed tends to be difficult (as a result, even if a seed diameter is narrowed, there is no influence on dislocation-free growth), by using a seed of a diameter of a degree of 15 mm, large diameter and heavy weight silicon single crystals of a degree of a diameter of 400 mm and a weight of 450 kg were able to be produced in a state free of

dislocation."

B Well-known invention

According to the descriptions of the above-mentioned Cited Documents 1-4, it can be said that the following invention is disclosed in each Cited Document 1-4. Hereinafter, the invention disclosed in each Cited Documents 1-4 is collectively referred to as the "well-known invention."

"A silicon single crystal having a diameter of at least 200 mm throughout a length of at least 200 mm, and being free from dislocation in a range of the length."

(2) Comparison

When the Invention is compared to the well-known invention, they are identical in the following corresponding feature and they are seemingly different in the following difference:

(Corresponding feature)

" A silicon single crystal having a diameter of at least 200 mm over a length of at least 200 mm, and being free from dislocation in a range of the length."

(Difference)

The Invention is specified by a manufacturing process as "produced from polysilicon rod material by crucible-free float zone method," whereas it is not clear whether the well-known invention has a resultant characteristic caused by that manufacturing process.

(3) Judgment of the difference

A Single crystal not doped with oxygen

Among single crystals subject to the Invention, a single crystal not doped with oxygen is discussed first. In the above-mentioned written opinion, the Appellant alleges that an FZ silicon single crystal has the amount of oxygen remarkably smaller than a CZ silicon single crystal. Since all the manufacturing processes specifically described in Cited Documents 1-4 fall under Czochralski method, the body can determine that a single crystal not doped with oxygen among single crystals subject to the Invention substantially differs from the single crystal of the well-known invention because of the amount of oxygen.

B Single crystal doped with oxygen

Among single crystals subject to the Invention, a single crystal doped with oxygen is discussed next. As stated in the paragraph "Regarding oxygen dope to FZ silicon single crystal" of the above-mentioned 1(2), although the Appellant alleges that only the Appellant had known that the known method of deliberately doping an FZ silicon single crystal with oxygen did not work on a silicon single crystal having a diameter of at least 200 mm (other persons skilled in the art had not known this), the Appellant has not shown a specific evidence at all that proves that a silicon single crystal having a diameter of at least 200 mm was not able to be doped by means of known methods. Therefore, the allegation cannot be accepted due to a technical ground thereof.

Accordingly, it cannot be said that known methods for doping oxygen as

disclosed in Japanese Unexamined Patent Application Publication No. S60-90899 presented in the written opinion by the Appellant and the like do not work on a silicon single crystal having a diameter of 200 mm or more. Therefore, as stated in the written reply by the Appellant, it should said that a CZ silicon single crystal and an FZ silicon single crystal doped with oxygen cannot be distinguished, as a person skilled in the art recognizes. Besides, the Appellant has not shown a specific evidence that there is significant difference regarding the amount of oxygen between an FZ silicon single crystal doped with oxygen having a diameter of at least 200 mm and a single crystal of the above-mentioned well-known inventions.

Therefore, a single crystal "doped with oxygen" of the Invention and a single crystal of the well-known inventions cannot be distinguished in terms of the amount of oxygen thereof, and thus, the difference related to the above-mentioned manufacturing process is not substantive among single crystals.

(4) Summary

According to the above paragraph B, the aforementioned difference is not substantive. Thus, the Invention is identical to inventions described in Cited Documents 1-4 and falls under Article 29(1)(iii) of the Patent Act. Therefore, the Appellant should not be granted a patent for this.

No. 6 Closing remarks

As mentioned above, since the statement of the scope of claims of the application does not meet the requirement stipulated in Article 36(6)(ii) of the Patent Act, or the Invention falls under Article 29(1)(iii) of the Patent Act, the Appellant should not be granted a patent for this. Thus, the application should be rejected without examining inventions according to the other remaining claims.

Accordingly, the appeal decision shall be made as described in the conclusion.

February 6, 2018

Chief administrative judge: NIIDA, Tomoo
Administrative judge: MISAKI, Hitoshi
Administrative judge: TAKIGUCHI, Hiroshi