Trial decision

Invalidation No. 2014-800107

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The case of trial regarding the invalidation of Japanese Patent No. 5479627 , entitled "PLANAR OR TUBULAR SPUTTERING TARGET AND METHOD FOR THE PRODUCTION THEREOF" between the parties above has resulted in the following trial decision:

Conclusion

The correction shall be approved as described in the corrected specification and corrected claims attached to the written correction request.

The trial of the case, concerning Claims 1, 2, 5, 6, 7, and 8, was groundless.

The trial of the case, concerning Claims 3 and 4, shall be dismissed.

3/4 of the costs in connection with the trial shall be borne by the demandant. The remainder shall be borne by the demandee.

Reasons

No. 1 History of the procedures

The history of the procedure relating to the Patent No. 5479627 is as follows:

April 4, 2013	patent application
	(Japanese Patent Application No. 2013-78389, Priority Claim under Paris Convention April 4, 2012, Germany)
May 16, 2013	written amendment
June 7, 2013	notice of reasons for refusal (drafting date)
December 17, 2013	written opinion and written amendment
January 8, 2014	notice of allowance (drafting date)
February 21, 2014	establishment
June 23, 2014	demand for invalidation trial of the case
October 7, 2014	written correction request and trial case answer (demandee)
November 28, 2014	written refutation (demandant)
December 24, 2014	notification of trial examination (drafting data)
January 26, 2015	oral proceedings statement brief (demandee)
February 16, 2015	oral proceedings statement brief (demandant)
March 5, 2015	oral proceeding

No. 2 As of October 7, 2014 correction request (hereinafter referred to as the "Correction Request")

1. Details of the Correction Request (Note for the body: Corrected parts are underlined.)

The Correction Request requests correction with respect to each group of claims, as described in the corrected claims and the corrected specification, which are made by attaching the claims and specification of the Patent to a written correction request, and the contents thereof are as follows:

(1) Correction 1

The description in Claim 1 of the claims,

"containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, respectively" is corrected to

"containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total."

(2) Correction 2

Claim 3 of the claims is deleted.

(3) Correction 3

Claim 4 of the claims is deleted.

(4) Correction 4

The description in Claim 5 of the claims, "sputtering target described in Claim 4" is corrected to "sputtering target described in Claim 1 or 2".

(5) Correction 5

The description in Claim 6 of the claims, "sputtering target described in one of Claims 1 to 5" is corrected to "sputtering target described in any of Claims 1, 2, and 5".

(6) Correction 6

The description in Claim 7 of the claims, "method of manufacturing a sputtering target described in any of Claims 1 to 5 and having a large surface area based on a silver-based alloy, as a planar sputtering target, having a surface area exceeding 0.3 m^2, and, as a tubular sputtering target, having a length of 1.0 m or longer" is corrected to "method of manufacturing a sputtering target, described in any of Claims 1, 2, 5 and 6, and having a large surface area based on a silver-based alloy, as a planar sputtering target, having a surface area exceeding 0.3 m^2, and, as a tubular sputtering target, having a length of 1.0 m or longer."

2. Judgment on the Correction Request

(1) Regarding the Correction 1

The Correction 1 corrects the description in Claim 1 regarding "content of the impurity substance of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome," from "respectively less than 0.5 mg/kg" to "less than 0.5 mg/kg in total," and aims at restriction of the scope of claims.

The description, "containing less than 0.5 mg/kg of the impurity substances in total" corresponds to matters specifying the invention mentioned in Claim 4 before correction, and is obviously within the range of matters described in the specification and claims attached to the request.

The Correction 1 does not substantially expand or change the scope of claims.

(2) Regarding the Correction 2

The Correction 2 deletes Claim 3 before correction of the claims, aims at restriction of the scope of claims, and is within the range of matters described in the specification and claims attached to the request.

The Correction 2 does not substantially expand or change the scope of claims.

(3) Regarding the Correction 3

The Correction 3 deletes Claim 4 before correction of the claims, aims at restriction of the scope of claims, and is within the range of matters described in the specification and claims attached to the request.

The Correction 3 does not substantially expand or change the scope of claims.

(4) Regarding the Correction 4

The Correction 4 aims at changing claim numbers to be cited, according to the Corrections 2, 3.

Thus, the Correction 4 aims at clarification of an ambiguous description, and is within the range of matters described in the specification and claims attached to the request.

Additionally, the Correction 4 does not substantially expand or change the scope of claims.

(5) Regarding the Correction 5

The Correction 5 aims at changing claim numbers to be cited, according to the Corrections 2, 3.

Thus, the Correction 5 aims at clarification of an ambiguous description, and is within the range of matters described in the specification and claims attached to the request.

Additionally, the Correction 5 does not substantially expand or change the scope of claims.

(6) Regarding the Correction 6

The Correction 6 aims at changing claim numbers to be cited, according to the Corrections 2, 3.

Thus, the Correction 6 aims at clarification of an ambiguous description, and is within the range of matters described in the specification and claims attached to the request.

Additionally, the Correction 6 does not substantially expand or change the scope of claims.

(7) Summary of the Corrections 1-6

As described above, the Corrections 1 to 6 fall under the provisions of Articles 126-(5) and (6) of the Patent Act which are applied mutatis mutandis pursuant to the

provisions of Article 134-2(1) and (9) of the Patent Act, and are recognized as legitimate correction.

No. 3 The Corrected Invention

As described in "No. 2," the correction in the Correction Request is recognized as a legitimate correction; thus, the inventions relating to Claims 1, 2, 5, 6, 7, and 8 of the Patent (hereinafter the inventions relating to the Claims are referred to as the "Corrected Invention 1" or the like, corresponding to the claim numbers, and generally referred to as the "Corrected Invention") are described as follows in Claims 1, 2, 5, 6, 7, and 8 of the corrected claims attached to the written correction request.

"[Claim 1]

A planar sputtering target having a surface area exceeding 0.3 m^2, or a tubular sputtering target having a length of 1.0 m or longer, made from a silver-based alloy containing at least one kind of additional alloy component selected from indium, tin, antimony, and bismuth respectively at a mass ratio of 0.01 to 5.0 wt% in total, with a crystal structure having an average grain size of less than 120 μm, oxygen content of less than 20 mg/kg, content of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome of less than 0.5 mg/kg in total, and metal purity of 99.99 wt% or higher.

[Claim 2]

The sputtering target described in Claim 1, including the silver-based alloy containing less than 10 mg/kg of oxygen.

[Claim 5]

The sputtering target described in Claim 1 or 2, containing less than 0.1 mg/kg of the impurity substance in total.

[Claim 6]

The sputtering target described in any of Claims 1, 2, and 5, having the average grain size of less than 100 μm.

[Claim 7]

The method of manufacturing a planar sputtering target having a surface area exceeding 0.3 m^2 made from a silver-based alloy described in any of Claims 1, 2, 5, and 6, or a tubular sputtering target having a length of 1.0 m or longer, including: melting an alloy having a nominal composition of silver and an at least one kind of additional alloy component selected from indium, tin, antimony, and bismuth at a mass ratio of 0.01 to 5.0 wt% in total; pouring the molten material into a mold, to

form a molding formed of the silver-based alloy; and deforming the molding, where graphite particles are added to the molten material under a reducing condition, to melt the alloy by induction melting while adjusting the oxygen content to less than 20 mg/kg.

[Claim 8]

The method described in Claim 7, including deforming the molding of the sputtering target made from the silver-based alloy at a temperature range between 650-750°C, under dynamic recrystallization of a crystalline structure, while achieving an average grain size of less than 120 μm."

No. 4 Summary of allegations of demandant and demandee

1. The demandant's allegation

The demandant demanded the decision, "The Patent regarding the patent according to Claims 1-8 of Japanese Patent No. 5479627 is invalid. The cost in connection with the trial shall be borne by the demandee," and submitted the following Evidences A No. 1 to A No. 3 as means of evidence.

According to the written request for invalidation trial, reasons for invalidation alleged by the demandant are described in the following (1) and (2). The reasons for invalidation alleged by the demandant in the written request relate to claims before the Correction Request, and thus "before correction" is clearly specified.

(1) Reason 1: Article 36-6(1) and 36-4(1) of the Patent Act

The invention described in Claim 1 before correction includes multiple kinds of impurity substances described in the same claim, and the content of each of the impurity substances is less than 0.5 mg/kg and the total content of the impurity substances significantly exceeds 0.5 mg/kg; however, the invention is not described in detailed descriptions of the invention.

In addition, regarding the invention described in Claim 3 before correction, the content of each of the impurity substances is less than 0.1 mg/kg, and the total content of the impurity substances significantly exceeds 0.1 mg/kg and further exceeds 0.5 mg/kg; however, the invention is not described in detailed descriptions of the invention.

Thus, the descriptions in claims of the Patent before correction commit a violation of Article 36-6(1) of the Patent Act.

The detailed description of the invention does not describe a method of obtaining a desired effect from the invention so as to be understood by a person skilled in the art, and thus the specification of the Patent commits a violation of

Article 36-4(1) of the Patent Act as well.

Claims 2-8 of the Patent before correction are all directly or indirectly subordinated to Claim 1, and thus the Patent is invalid regarding all the claims. (Written demand for trial p. 2 l. 9-l. 22)

(2) Reason 2: Article 29-2 of the Patent Act

The invention according to Claims 1-3, and 6 of the Patent before correction is the same as the invention described in the specification or claims (Evidence A No. 1) attached first to the application of Japanese Patent Application No. 2012-71328 (Japanese Unexamined Patent Application Publication No. 2013-204052) which was filed before the priority date of the Patent and then published. Thus, the invention commits a violation of Article 29-2 of the Patent Act. (Written demand for trial p. 2 l. 23-p. 3 l. 1)

[Means of proof]

Evidence A No. 1: Japanese Unexamined Patent Application Publication No. 2013-204052 (Japanese Patent Application No. 2012-71328, filed on March 27, 2012, published on October 7, 2013)

Evidence A No. 2: "IWANAMI, Physics and Chemistry Dictionary, 5th Edition" (edited by NAGAKURA, Saburo and five other editors, Iwanami Shoten), 2nd impression of 5th Edition, published on April 24, 1998, p. 114

Evidence A No. 3: Japanese Unexamined Patent Application Publication No. H9-256083

(hereinafter referred to as "Evidence A No. 1" or the like, for the above numbers of the evidences A)

2. The demandee's allegation

The demandee demanded the decision, "The correction shall be approved, the trial of the case shall be found groundless, and costs in connection with the trial shall be borne by the demandant."

According to the trial case answer, the demandee's allegation is described in the following (1) and (2):

(1) Regarding Reason 1

The demandant's allegation is groundless because the invention according to Claim 1 before correction was restricted by a configuration described in Claim 4 before correction, ... the total of the "content of the impurity substance of aluminum,

lithium, sodium, calcium, magnesium, barium, and chrome," specified in Claim 1, is less than 0.5 mg/kg.

...it could be said that the detailed description of the invention of the Patent describes that the total of the content of the impurity substance of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome is controlled to be less than 0.5 mg/kg, to prevent micro-arc discharge or scattering in the target, so as to be understood by a person skilled in the art with explicit evidence.

Therefore, the descriptions in the scope of claims and detailed description of the invention of the Patent, regarding all the inventions according to Claims 1, 2, 5, 6, 7, and 8 after correction, satisfy the requirement stipulated in Articles 36-6(1) and 36-4(1) of the Patent Act. (trial case answer p. 7 l. 19-p. 8 l. 22)

(2) Regarding Reason 2

According to the written correction request, the invention relating to Claim 1 is restricted by a configuration described in Claim 4 before correction where reasons for invalidation (Article 123-1(2) of the Patent Act) according to the reason 2 (Article 29-2 of the Patent act) are not alleged, and thus there are no grounds. Patentability of the inventions according to Claims 1, 2, and 6 after correction is not denied, on grounds of Evidence A No. 1.

...Evidence A No. 1 describes only that non-metal inclusion is an oxide of refractory in a kiln or addition component that may be included in the target during fusing and casting (Evidence A No. 1, paragraph 0019), and does not specifically describe elements to be included, at all. Evidence A No. 1 does not specifically describe that the non-metal inclusion is an impurity substance of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, at all.

In short, the silver-based alloy can contain an impurity substance of a wide range of kinds and content. Even though the breakdown of the element included as the non-metal inclusion is not specified at all, the kind and content of the non-metal inclusion in Example 3 of Evidence A No. 1 cannot be estimated on the basis of the descriptions in Table 1 in Evidence A No. 3, which is totally different from the above.

The demandant's allegation on the impurity substances that there is no difference in technical significance between the expression in Evidence A No. 1, "the quantity of non-metal inclusion: 3 ppm," and the expression described in Claim 1 before correction in the Corrected Invention, "content of the impurity substance respectively less than 0.5 mg/kg" has no grounds, and is improper.

...The Patent, regarding the inventions according to Claims 1, 2, 5, and 6 after

correction, does not fall under unpatentable invention in accordance with the provisions of Article 29(2) of the Patent Act. (trial case answer p. 9, l.3-p.11, l.17)

No. 5 Judgment on the body

1. Regarding Reason 1

(1) According to the Correction Request, the Corrected Invention 1 specifies containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total.

The Corrected Invention assumes that an element having the total content of impurity substance exceeding 0.5 mg/kg is included, while the Corrected Invention 1 and the Corrected Inventions 2, 5, 6, 7, and 8 which cite the Corrected Invention 1 do not include an element having the total content of impurity substance exceeding 0.5 mg/kg. The reason 1 alleged by the demandant does not satisfy the assumption, and cannot be accepted.

(2) Regarding argument of demandant

The demandant alleges about the descriptions in the scope of claims, as follows.

"Paragraph [0013] in the specification describes, 'Oxygen enters into an alloy through another metal having high affinity for oxygen, such as aluminum, lithium, sodium, calcium, magnesium, barium, or chrome.' However, as described in p. 8-p. 9 in a written demand for trial, this description applies to aluminum, calcium, barium, and magnesium, while it does not apply to lithium, sodium, and chrome. ...At least, regarding lithium and sodium, the technical significance of the reason why the total content of the elements should be controlled is not disclosed in the specification. There is no description about the problem to be solved by the invention and solution thereof, and a matter which is necessary for those who have ordinary skill in a field of the technology to understand the technical significance of the invention. ...The description of the scope of claims after correction according to the Correction Request does not also fall under the provisions of Article 36-6(1) of the Patent Act." (written refutation p.2 last to p.3, l.18)

The written demand for trial describes, in p.8 last to p.9, l.4, as follows.

"Aluminum, calcium, barium, and magnesium are highly likely to exist as oxides. When they exist, they are to be analyzed as non-metal inclusions. On the other hand, sodium and chrome are supposed to exist as metal, and lithium is highly likely to exist as solid soluble metal."

We will examine whether or not the Corrected specification describes the technical significance of the total content of impurity substances, including lithium and sodium, less than 0.5 mg/kg, in the Corrected Invention.

The Corrected specification describes as follows.

"[0009]

Thus, the problem of the Invention is to provide a large-area sputtering target based on a silver alloy. A planar sputtering target having a surface area exceeding 0.3 m^2, or a tubular sputtering target having a length of 1.0 m or longer, is configured to reduce the risk of spark discharge, thereby enabling a sputtering process with comparatively high output density."

"[0013]

For reducing spark discharge, an alloy is required to have an oxygen content of 50 ppm by mass or less. However, depending on manufacturing, a sputtering target made of a silver-based alloy contains, for example, a predetermined metal oxide component containing oxygen of a predetermined ratio and to be derived from silver granules. Furthermore, via other metals having high affinity for oxygen, such as aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, oxygen enters into the alloy. In the silver-based alloy of this invention, density of the metal to be measured by GDMS is limited to be less than 0.5 ppm by mass, preferably less than 0.1 ppm by mass.

[0014]

It is obvious that a specific impurity substance having high affinity for oxygen can be a cause of spark discharge. According to the Invention, metal purity of the silver-based alloy is preferably equal to or higher than 99.99 percent by mass. High purity excludes any kinds of impurity substances."

"[0016]

Oxygen content of the silver-based alloy is as low as possible, preferably less than 20 ppm, particularly preferably less than 10 ppm.

[0017]

For the content, in order to avoid the impurity substance having the oxygen affinity described above, the total content thereof in the silver-based alloy is less than 0.5 ppm, preferably less than 0.1 ppm."

According to the above descriptions, in a large-area sputtering target based on a silver alloy, based on the understanding that it is required to reduce oxygen content in

the silver alloy for reducing spark discharge, on the basis of the knowledge that oxygen enters into the silver alloy via metals having high affinity for oxygen, such as aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, it can be understood that the Corrected Invention is configured to contain metal in total at less than 0.5 ppm, and has a significant effect of reducing the risk of spark discharge during sputtering, and enabling a sputtering process with comparatively high output density.

Aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, in a silver alloy, can be "impurity substances." Thus, it may be concluded that the Corrected specification discloses technical significance to "containing less than 0.5 mg/kg of impurity substances, such as aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total" in a sputtering target based on a silver alloy.

As alleged by the demandant in the Written demand for trial p. 8 last to p. 9, l. 4, in a silver alloy, lithium exists as solid soluble metal and sodium is likely to exist as metal, while, it cannot be said that, in the silver alloy, it is common general knowledge that all lithium is solid soluble and all sodium exists as metal.

It is common general knowledge that lithium and sodium are substances each forming oxides and having high affinity for oxygen. It cannot be said that, in a silver alloy, lithium and sodium do not exist as metals which provide the silver alloy with oxygen.

Therefore, according to the descriptions in the Corrected specification, it can be said that impurity substances including lithium and sodium are limited, to reduce the risk of spark discharge during sputtering and to enable a sputtering process with comparatively high output density. Thus, it can be said that the Corrected specification also discloses technical significance to containing less than 0.5 ppm of impurity substances, including lithium and sodium.

Therefore, it must be concluded that the technical significance to containing less than 0.5 ppm of metal having high affinity for oxygen, including lithium and sodium in total, is disclosed. Thus, the allegation of the demandant on Reason 1 described above cannot be accepted.

(3) Summary

As described above, it cannot said that the description in the scope of claims of the Patent does not fall under the provisions of Article 36-(6)1 of the Patent Act, and that the description in the detailed descriptions of the invention does not fall under the provisions of Article 36-4(1) of the Patent Act, as well.

Therefore, no part of Reason 1 alleged by the demandant has reasons.

2. Regarding Reason 2

(1) Descriptions in Evidences A No. 1-No. 3

A Regarding Evidence A No. 1

Evidence A No. 1 describes about "Silver-based cylindrical target and manufacturing method thereof" (TITLE) (Note: underlines are added by the body).

"[Detailed description of the invention]

[Technical field]

[0001]

The Invention relates to a silver-based cylindrical target for forming a conductive film, such as a reflection electrode of an organic EL element and a wiring film of a touch panel, and a manufacturing method thereof."

"[Solution for the problem to be solved]

[0008]

The inventors have learned as follows, as a result of intensive research on reduction of particles during sputtering.

... snip...

It was found that crystal grains need to be recrystallized in order to further reduce the micro-arc discharge. The recrystallized crystal grain has an isotropic shape. It was also found that micro-arc discharge is likely to occur when a lot of oxygen and non-metal inclusions are contained in the material.

The invention provides the following solutions, in terms of the above knowledge.

[0009]

Therefore, the silver-based cylindrical target of the Invention is made of silver or a single-phase silver alloy formed by dissolving an addition component in silver. The crystal grain has a ratio of 0.8-1.2, in a cross section including a central axis of the cylinder, between a diameter in a direction along the central axis and a diameter in a direction orthogonal to the central axis. Oxygen content is equal to or less than 100 ppm. The content of non-metal inclusion is equal to or less than 20 ppm.

[0010]

The silver-based cylindrical target is made of pure silver or a single-phase silver alloy; thus, specific resistance is uniform in the material, and micro-arc discharge is unlikely to occur. When the crystal grain is flattened due to the ratio of diameter beyond the range of 0.8-1.2, irregularity of a sputtering surface of the target is increased with wear due to continuous sputtering, resulting in increase of micro-arc discharge.

When the oxygen content exceeds 100 ppm or the content of non-metal inclusion exceeds 20 ppm, micro-arc discharge remarkably occurs during sputtering."

"[0012]

The silver-based cylindrical target of the Invention is made of a silver alloy. The addition component thereof is made of at least one of Mg, Al, Zn, Ga, Pd, In, Sn, Sb, and Au."

"[0013]

The method of manufacturing the silver-based cylindrical target includes: a hot-extrusion step of extruding silver or an ingot formed by dissolving an addition component in silver under the condition of an extrusion ratio of 4-15 and a material temperature of 500-800°C immediately after the extrusion, into a cylindrical shape; and a cooling step of cooling the cylindrical body formed after the hot-extrusion step to 200°C or less within ten minutes after the extrusion."

"[0017]

The silver-based cylindrical target is formed of silver or a single-phase silver alloy formed by dissolving an addition component in silver. A crystal grain has a ratio of 0.8-1.2, in a cross section including a central axis of the cylinder, between a diameter in a direction along the central axis and a diameter in a direction orthogonal to the central axis. Oxygen content is equal to or less than 100 ppm. The content of non-metal inclusion is equal to or less than 20 ppm. The cylindrical target is not limited in size. For example, the cylindrical target has an outer diameter of 145-165 mm, an inner diameter of 135 mm, and a length of 1-3 m.

The addition component for the silver alloy is selected from among at least one of Mg, Al, Zn, Ga, Pd, In, Sn, Sb, and Au."

"[Examples]

[0029]

(Examples 1, 2)

Ag with purity of 99.99 mass% or higher is loaded in a high-frequency induction melting furnace with a graphite crucible. The total mass is about 700 kg at the time of melting. A cast-iron mold is used for casting.

Piping of the ingot obtained by casting is removed, and a surface in contact with the mold is ground, to obtain a cylindrical billet, as a sound section having an outer diameter of 350 mm and a length of 470 mm, substantially. In Example 2, a hole-less billet is extruded. In Example 1, there is extruded a cylindrical billet with a hole of 140 mm formed by removing the central part, with an outer diameter of 350 mm, an inner diameter of 140 mm, and a length of 470 mm.

[0030]

The billets are heated up to 750°C, loaded in a container in an extruder, extruded, and cooled by a water shower. After correction, the surface is cut by a few mm, to manufacture a silver cylindrical body. With a stainless backing tube, the silver cylindrical body is bonded by In solder, to form a cylindrical target. The extrusion ratio during hot-extrusion, temperature of the cylindrical body immediately after extrusion, and the time for cooling to 200°C or lower are as shown in Table 1.

[0031]

(Examples 3-12, Comparison examples 1, 2)

Ag with purity of 99.99 mass% or higher and various kinds of addition raw materials are loaded in a high-frequency induction melting furnace with a graphite crucible. The total mass is about 400 kg at the time of melting.

In melting, Ag is melted, the addition raw materials are loaded after Ag is melted, so as to achieve a target composition shown in Table 1; molten alloy is sufficiently agitated by agitation effect of induction heating, and casted in a cast-iron mold.

A cylindrical billet having an outer diameter of 265 mm, an inner diameter of 140 mm, and a length of 490 mm is manufactured from an ingot obtained by casting, and a cylindrical body is obtained by extrusion. The extrusion ratio at the time of hot-extrusion and temperature of the cylindrical body immediately after extrusion are as shown in Table 1. In Table 1, data indicating the time for cooling to 200°C are obtained by cooling with water shower, while data indicating "none" are obtained by cooling as it is. In the same way as in Example 1, the billet is corrected, cut, and machined, to manufacture a silver alloy cylindrical body, which is bonded to a backing tube, to form a cylindrical target."

"[0036]

[Table 1]

#1

	#2 添加元素(原料) 種類	#2 添加元素(原料) 量(質量%)	#3 押出直後の温度(℃)	#4 押出比(%)	#5 冷却までの時間(分)	#6 引抜加工の加工率(%)	#7 熱処理 温度(℃)	#7 熱処理 時間(hr)
実施例1	-	-	570	9.8	7	-	-	-
実施例2	-	-	670	14.9	8	-	-	-
比較例1	Sn	0.5	480	6.3	6	-	-	-
実施例3	In	1.0	510	6.3	6	-	-	-
実施例4	In Sb	0.5 1.0	650	6.3	6	-	-	-
実施例5	Sb	2.5	780	6.3	6	-	-	-
実施例6	In	1.5	830	6.3	#8 6	-	-	-
実施例7	Sn	0.3	590	6.3	なし	-	-	-
比較例2	Sb	1.5	580	3.9	7	-	-	-
比較例3	Cr	1.5	590	6.3	7	-	-	-
実施例8	Sn	2.3	570	4.6	7	-	-	-
実施例9	Mg	1.0	580	4.6	7	-	-	-
実施例10	Al Zn	0.3 0.5	580	4.6	7	-	-	-
実施例11	Ga	2.3	570	4.6	7	-	-	-
実施例12	Au	1.5	580	8.4	6	-	-	-
実施例13	-	-	560	7.5	-	32.3	460	2.0
実施例14	In	0.5	570	7.5	-	32.3	550	1.0
実施例15	Sb	3.0	570	7.5	-	32.3	650	0.5
比較例4	In	3.0	580	7.5	-	32.3	400	1.5
実施例16	In	0.7	580	7.5	-	32.3	700	1.0
実施例17	Sn	3.5	540	7.0	-	22.0	580	1.0
実施例18	Pd	1.0	550	7.0	-	22.0	630	1.0
実施例19	Sn Sb	1.5 1.5	550	7.0	-	22	530	1.5
比較例5	Sn	1.0	540	7.0	-	18.0	500	1.0
比較例6	Mg	0.8	570	7.0	6	-	-	-
比較例7	Pd	2.0	590	7.0	6	-	-	-

#1 Example 1

Example 2

Comparison example 1

Example 3

Example 4

Example 5

Example 6

Example 7

Comparison example 2

Comparison example 3

Example 8

Example 9

Example 10

Example 11

Example 12

Example 13

Example 14

Example 15

Comparison example 4

Example 16

Example 17

Example 18

Example 19

Comparison example 5

Comparison example 6

Comparison example 7

#2 Addition element (raw material)

Kind

Quantity (mass%)

#3 Temperature immediately after extrusion (°C)

#4 Extrusion ratio (%)

#5 Time to cooling (min.)

#6 Machining ratio of drawing (%)

#7 Heat treatment

Temperature (°C)

Time (hr)

#8 none

[0037]

The obtained cylindrical target is measured in terms of isotropy, average grain size, and variability of the crystal grains. Oxygen content and content of non-metal inclusion are measured. The cylindrical target is mounted on a sputtering device to measure the occurrence of micro-arc during sputtering.

(1) Isotropy, average grain size, and variability of crystal grains

Samples are obtained evenly at 16 points from the cylindrical target manufactured as above, as described in embodiments for implementing the invention, and a diameter in a direction along a central axis of the cylinder and a diameter in a direction orthogonal to the central axis are measured, to measure isotropy (ratio of radius), an average value of the diameter (average grain size), and variability thereof.

[0038]

(2) Occurrence of micro-arc during sputtering

The cylindrical target manufactured as above is soldered to a copper backing plate, to measure the occurrence of micro-arc during sputtering.

... snip...

(3) Reflectance of sputter film, and specific resistance

... snip...

Results are shown in Table 2.

[0039]

[Table 2]

#1 #2 #3 #4 #5 #6 #7 #8 #9

	結晶粒形状の等方性 軸方向粒径／径方向粒径	酸素量（質量ppm）	非金属介在物量（質量ppm）	粒径（μm）	粒径ばらつき（%）	マイクロアーク発生回数（回） 使用初期	マイクロアーク発生回数（回） 消耗後	膜の反射率（%）	膜の比抵抗（μΩ・cm）
実施例1	1.1	10	3	120	16	3	5	97.7	3.2
実施例2	1.0	10	3	200	12	4	6	97.6	3.3
比較例1	1.5	20	2	40	30	11	33	96.7	4.2
実施例3	1.2	10	3	60	18	5	7	95.9	4.5
実施例4	1.0	20	4	180	14	2	6	96.1	5.1
実施例5	1.0	20	3	350	12	3	10	94.2	7.0
実施例6	0.9	10	2	440	12	8	24	95.5	5.9
実施例7	1.1	10	3	410	25	9	22	97.2	4.0
比較例2	1.5	10	2	230	35	15	36	95.3	5.8
比較例3	1.8	90	13	150	15	25	238	93.2	8.2
実施例8	1.1	20	2	120	15	3	3	93.8	7.8
実施例9	1.1	10	4	140	16	2	4	96.1	4.8
実施例10	1.1	10	4	130	16	3	4	96.6	4.3
実施例11	1.2	20	2	110	17	3	5	94.0	7.3
実施例12	1.0	10	2	140	16	3	4	94.7	6.5
実施例13	1.2	20	2	80	18	4	3	97.7	3.2
実施例14	1.1	10	2	130	14	2	3	96.7	4.3
実施例15	1.1	10	3	300	13	2	4	92.5	8.9
比較例4	1.8	20	3	120	38	18	29	92.7	8.6
実施例16	1.0	10	2	450	11	2	23	96.5	4.4
実施例17	1.1	10	4	150	16	3	5	91.9	9.2
実施例18	1.0	10	3	170	17	3	7	95.4	4.6
実施例19	1.2	20	3	230	19	7	12	92.3	8.8
比較例5	1.3	10	2	280	25	9	27	96.1	4.5
比較例6	1.1	140	15	150	15	30	55	90.3	10.7
比較例7	1.1	20	24	140	14	26	81	93.5	7.7

#1 Example 1

Example 2

Comparison example 1

Example 3

Example 4

Example 5

Example 6

Example 7

Comparison example 2

Comparison example 3

Example 8

Example 9

Example 10

Example 11

Example 12

Example 13

Example 14
Example 15
Comparison example 4
Example 16
Example 17
Example 18
Example 19
Comparison example 5
Comparison example 6
Comparison example 7

#2 Isotropic crystal shape, axial grain size/radial grain size

#3 Quantity of oxygen (mass ppm)

#4 Quantity of non-metal inclusion (mass ppm)

#5 Grain size (μm)

#6 Variability of the grain size (%)

#7 Occurrence of micro-arc (times)
Beginning of use
After wear

#8 Reflectance of film (%)

#9 Specific resistance of film (μΩ. cm)

[0040]

In the cylindrical target of the embodiment, an isotropic crystal grain has a ratio of 0.8-1.2, in a cross section including a central axis of the cylinder, between a diameter in a direction along the central axis and a diameter in a direction orthogonal to the central axis, an average grain size of 30-400μm, and variability of 20% or less in average grain size. Oxygen content is equal to or less than 100 ppm. The content of non-metal inclusion is low, and equal to or less than 20 ppm. Micro-arc occurs rarely during sputtering even after wear as well as at the beginning of use."

According to the description ([0031]), "In melting, Ag is melted, the addition raw materials are loaded after Ag is melted, so as to achieve a target composition shown in Table 1, ... and casted in a cast-iron mold.

A cylindrical billet ... is manufactured from an ingot obtained by casting, and a cylindrical body is obtained by extrusion. ... In the same way as in Example 1, the billet is corrected, cut, and machined, to manufacture a silver alloy cylindrical body, which is bonded to a backing tube, to form a cylindrical target." and from the

description "In" in the field "Kind" and the description "1.0" in the field "Quantity (mass %)" of "Addition element" in "Example 3" in Table 1, it can be seen that the "cylindrical target "of "Example 3" is made of a "silver alloy," which contains 1 mass % of In (indium).

Therefore, it can be acknowledged that Evidence A No. 1 describes, as "Example 3," "a cylindrical sputtering target, which is made of a silver alloy formed by containing 1.0 mass% of In (indium) in Ag (silver) with purity of 99.99% or higher, with a length of 1-3 m, having oxygen content of 10 mass ppm, the content of non-metal inclusion of 3 mass ppm, and an average particle grain size of 60 μm" (hereinafter referred to as "Prior invention").

The demandant acknowledges the "Example 3" as a "Prior invention," since "example 3" of Evidence A No. 1 is cited, in a "comparison table" (Written demand for trial p.3-4) between the Patent and the Invention described in the specification attached first to the application according to Evidence A No. 1 or the scope of claims.

B Regarding Evidence A No. 2

In Evidence A No. 2, the section "Non-metal inclusion" describes that "indicating oxide, sulfide, nitride, carbide, or silicate, which remains in refined metal in a molten state, or precipitates due to reduction in solubility during cooling/solidification and remains in a metal material, and is likely to generate abnormal structures and cause cracks or surface scratches."

C Regarding Evidence A No. 3

In Evidence A No. 3, "METHOD AND APPARATUS FOR MANUFACTURING HIGH-PURITY SILVER" (Title) is described as follows.

"[0001]

[Field of industrial application] The invention relates to a method and apparatus for manufacturing high-purity silver with purity of 99.9999 wt% or higher, by vacuum distillation, from commercial electrolytic silver, shot silver, and ingot silver with purity of about 99.99 wt%."

"[0008]

[Problem to be solved by the invention] As described above, the prior art has an object to provide a method and apparatus for directly manufacturing an ingot of high-purity silver with purity of 99.9999 wt% or higher, by developing new

distillation means for separating gold, palladium, or lead which cannot be completely separated from silver."
"[0010] Thus, the first aspect of the Invention is high-purity silver with purity of 99.9999 wt% or higher, containing 0.5 ppm or less of sulfur, iron, copper, palladium, gold and lead, respectively, and less than 1 ppm of impurity substances, other than gas components, in total."
"[0018] Therefore, in this invention, Na, Si, S, K, Ca, Cr, Fe, Ni, Cu, Pd, Au, and Pb are measured, in quantitative analysis by means of a glow-discharge mass spectrometer. When a value obtained by subtracting the total quantity of the impurity substances from 100 wt% is equal to or more than 99.9999 wt%, high-purity silver with purity of 99.9999 wt% or higher is defined."

As described above, it is acknowledged that Evidence A No. 3 describes "high-purity silver with purity of 99.9999 wt% or higher, which is manufactured by vacuum distillation, from commercial electrolytic silver, shot silver, and ingot silver with purity of about 99.99 wt%, contains 0.5 ppm or less of sulfur, iron, copper, palladium, gold, and lead, respectively, and less than 1 ppm of impurity substances, other than gas components, in total, and is defined when a value obtained by subtracting the total quantity of the impurity substances from 100 wt% is equal to or more than 99.9999 wt% as a result of quantitative analysis by means of a glow-discharge mass spectrometer by measuring Na, Si, S, K, Ca, Cr, Fe, Ni, Cu, Pd, Au, and Pb."

(2) Comparison/judgment

The Corrected Invention 1 is compared with the Prior invention.

"Silver alloy," "cylinder," "crystal grain," "average grain size," and "oxygen content" in the Prior invention correspond to "Silver-based alloy," "cylindrical," "crystal structure," "average granularity," and "oxygen content ratio" in the Corrected Invention 1, respectively.

"In (indium)" in the "silver alloy formed by containing 1.0 mass% of In (indium) in Ag (silver) with purity of 99.99 mass% or higher" in the Prior invention corresponds to "alloy component" in the Corrected Invention 1. The description, "containing 1.0 mass %" of the "In (indium)" in the Prior invention is included in "a mass ratio of 0.01-5.0 mass%" of the "alloy component" in the Corrected Invention 1.

The description that the "average grain size of the crystal grain" in the Prior invention is "60 μm" is included in "average granularity of less than 120 μm" of

"crystal structure" in the Corrected Invention 1.

"Mass ppm," which is a unit of "oxygen content" in the Prior invention, indicates a ratio in one million, or is equivalent to the number of mg per 1 kg, and thus "oxygen content of 10 ppm" in the Prior invention can be expressed by "oxygen content of 10 mg/kg," and is included in "oxygen content of less than 20 mg/kg" in the Corrected Invention 1.

Therefore, the Corrected Invention 1 and the Prior invention are common in the point of "a cylindrical sputtering target having a length of at least 1.0 m, formed of a silver-based alloy having an indium alloy component with a mass ratio of 0.01-5.0 mass%, and having a crystal structure with an average granularity of less than 120 μm and an oxygen content ratio of less than 20 mg/kg," while differing in the following different features.

(The different feature 1)

The "silver-based alloy" of the "sputtering target" in the Corrected Invention 1 "contains less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, in total," while the "silver alloy" in the "cylindrical sputtering target" in the Prior invention "contains 3 mass ppm of non-metal inclusion." "The total content ratio of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome, is unknown.

(The different feature 2)

"Metal purity" of the "sputtering target" in the Corrected Invention 1 is "at least 99.99 mass%," while the "cylindrical sputtering target" of the Prior invention is formed of " a silver alloy formed by containing 1.0 mass % of In (indium) in Ag (silver) with purity of 99.99 mass% or higher," and the "purity" of the "In (indium) " is unclear. "Metal purity" of the "cylindrical sputtering target" in the Prior invention is unknown.

In view of the case, first, we will examine the different feature 1.

In Evidence A No.1, there is no description about "non-metal inclusion," and it is not clear whether the "non-metal inclusion" in the Prior invention indicates any of "aluminum, lithium, sodium, calcium, magnesium, barium, or chrome."

As described in Evidence A No. 2, even if the "non-metal inclusion" is "oxide, sulfide, nitride, carbide, or silicate, which remains in refined metal in a molten state,

or precipitates due to reduction in solubility during cooling/solidification and remains in a metal material," there is no description or suggestion in Evidence A No. 1 as to with use of what process "Ag (silver) with purity of 99.99 mass% or higher" in the Prior invention has been produced by dissolving and refining a raw material of silver with what kind of impurity substance, and cooling/solidifying it with what manner. Thus, it is not certain which of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome is indicated by the "non-metal inclusion" in the Prior invention.

Therefore, it cannot be acknowledged that "containing 3 mass ppm of non-metal inclusion" in the Prior invention indicates "containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total."

The "high-purity silver with purity of 99.9999 wt% or higher" described in Evidence A No. 3 contains "Na, Si, S, K, Ca, Cr, Fe, Ni, Cu, Pd, Au, and Pb" to be measured as impurity substances, and it is not clear how much "aluminum, lithium, magnesium, and barium" are contained in the "high-purity silver."

There is no grounds for interpreting that the "Ag (silver) with purity of 99.99 mass% or higher" in the Prior invention is manufactured by a method of manufacturing the "high-purity silver with purity of 99.9999 wt% or higher" as described in Evidence A No. 3. The "total content of impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome" of the "sputtering target" in the Prior invention cannot be specified in reference to the descriptions in Evidence A No. 3.

As described above in "1. (2)," it cannot be said that there is no technical significance in the matters specifying the invention relating to the difference feature 1. The different feature 1 is a substantial difference, and without examining the different feature 2, it cannot be decided that the Corrected Invention 1 is identical to the Prior invention.

According to the descriptions other than "Example 3" in Evidence A No. 1, it cannot be recognized that an invention identical to the Corrected Invention 1 is described.

(3) Regarding argument of demandant

Demandant's allegation about the Corrected Invention is as follows.

"The patent invention after correction and the Prior invention are substantially different in the point that the content ratio of the impurity substance is "less than 0.5 mg/kg of impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total" in the patent invention after correction, while "1.5-1.8 ppm of impurity substances of aluminum, calcium, magnesium, and barium in total" in the Prior invention. ...

...Technical significance is unknown in specifying VU<0.5 (mg/kg) with respect to "1.5-1.8 ppm of impurity substances of aluminum, calcium, magnesium, and barium in total" in the Prior invention. It cannot be recognized that a configuration, "containing less than 0.5 mg/kg of impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total" in the patent invention after correction is substantially different. ...

...The content of lithium, sodium and chrome can be estimated to be very small even in the Prior invention. They cannot cause oxygen to enter an alloy in dissolution and casting of Evidence A No. 1, and there is no technical significance to specifying the content ratio.

As described above, no difference in technical significance can be recognized between "3 mass ppm of non-metal inclusion" in the Prior invention and "containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total" in the patent invention after correction. Both fall within a range of substantial identification in Article 29-2 of the Patent Act." (oral proceedings statement brief p. 3, l.1 -p. 4, l.19)

However, as described above in "1. (2)," it cannot be said that there is no technical significance in "containing less than 0.5 mg/kg of the impurity substances of aluminum, lithium, sodium, calcium, magnesium, barium, and chrome in total" in the Corrected Invention 1, and thus, the allegation of the demandant cannot be accepted.

(4) Summary

It cannot be said that the Corrected Invention 1 is identical to the Prior invention. The Corrected Inventions 2, 5, 6, 7, and 8 are those further limited by citing the Corrected Invention 1, and are not identical to the Prior invention, as well.

Therefore, no part of the reasons for Reason 2 alleged by the demandant has reasons.

3. Summary

As examined above, no part of the reasons for Reason 1 and Reason 2 alleged by the demandant has reasons.

No. 6 Conclusion

As described above, the allegation and the means of proof of the demandant cannot invalidate the patent of the Corrected Inventions 1, 2, 5, 6, 7, and 8.

3/4 of the costs in connection with the trial shall be borne by the demandant under the provisions of Article 61 of the Code of Civil Procedure which is applied mutatis mutandis in the provisions of Article 169-2 of the Patent Act, and the remainder shall be borne by the demandee.

Therefore, the trial decision shall be made as described in the conclusion.

April 8, 2015

Chief administrative judge: KAWAHARA, Hideo

Administrative judge: KAWABATA, Osamu

Administrative judge: MAMADA, Tadahiro