### Decision on Opposition

Opposition No. 2018-700153

Tokyo, Japan Patentee	Mitsui Chemicals Inc
Patent Attorney	NAKAJIMA, Jun
Patent Attorney	KATO, Kazuyoshi
Patent Attorney	FUKUDA, Koji
Tokyo, Japan Opponent	SUZUNO, Mikio

The Opposition case of the invention of Patent No. 6184611, entitled "PIEZOELECTRIC POLYMER FILM", has resulted in the following conclusion:

### Conclusion

The patents according to Claims 1 to 13 of Patent No. 6184611 should be maintained.

### Reason

1 History of the procedures

The application for the patents according to Claims 1 to 13 of the Patent No. 6184611 was an application with an international filing date of October 16, 2015 (domestic priority date of November 14, 2014), followed by registration of the patent right on August 4, 2017, and then a patent gazette was published on August 23, 2017, and thereafter the Opponent, Mikio Suzuno, raised an opposition to the grant of the Patent on February 23, 2018.

### 2 The patent invention

The patent inventions according to Claims 1 to 13 of the Patent No. 6184611 should be specified respectively by the matters recited in Claims 1 to 13 of the scope of the claims set forth as below:

## "[Claim 1]

A polymer piezoelectric film comprising: a helical chiral polymer (A) having an optical activity with a weight average molecular weight of 50,000 to 1,000,000;

a degree of crystallization obtained by DSC method is 20% to 80%;

a standardized molecular orientation MORc is 3.5 to 15.0, supposing that a standard thickness measured by a microwave transparent-type molecular orientation meter is  $50 \,\mu\text{m}$ ;

in a waveform measured with an inline film thickness meter and representing a relationship between a position in a width direction on the film and a thickness of the film, a number of peaks A is 20 or less per 1,000 mm of a film width, wherein

the peaks A have a peak height of 1.5 µm or more, and a peak slope of 0.000035 or more.

### [Claim 2]

The polymer piezoelectric film according to Claim 1, wherein in the waveform measured with the inline film thickness meter and representing the relationship between a position in the width direction on the film and a thickness of the film, a number of peaks B is 12 or less per 1,000 mm of the film width, wherein

the peaks B have a peak height of  $1.5 \,\mu\text{m}$  or more and a peak slope of 0.00008or more.

[Claim 3]

The polymer piezoelectric film according to Claim 1 or Claim 2, wherein an internal haze with respect to visible light is 50% or less, and a piezoelectric constant d14 measured by a stress-electric charge method at 25°C is 1 pC/N or more. [Claim 4]

The polymer piezoelectric film according to any one of Claim 1 to Claim 3, wherein an internal haze with respect to visible light is 13% or less. [Claim 5]

The polymer piezoelectric film according to any one of Claim 1 to Claim 4, wherein the helical chiral polymer (A) is a polylactic acid-based polymer having a main chain comprising a repeating unit represented by the following Formula (1): [Chemical Formula 1]



# [Claim 6]

The polymer piezoelectric film according to any one of Claim 1 to Claim 5, wherein a content of the helical chiral polymer (A) is 80% by mass or more. [Claim 7]

The polymer piezoelectric film according to any one of Claim 1 to Claim 6, wherein a product of the standardized molecular orientation MORc and the crystallinity is from 40 to 700.

### [Claim 8]

The polymer piezoelectric film according to any one of Claim 1 to Claim 7, wherein an internal haze with respect to visible light is 1.0% or less. [Claim 9]

The polymer piezoelectric film according to any one of Claim 1 to Claim 8, comprising from 0.01 parts by mass to 10 parts by mass of a stabilizer (B) per 100 parts by mass of the helical chiral polymer (A), the stabilizer (B) having a weight average molecular weight of from 200 to 60,000 and having one or more functional groups selected from the group consisting of a carbodiimide group, an epoxy group, and an isocyanate group.

### [Claim 10]

The polymer piezoelectric film according to any one of Claim 1 to Claim 9, wherein the number of the peaks A is 15 or less per 1,000 mm of the film width. [Claim 11]

The polymer piezoelectric film according to any one of Claim 1 to Claim 10, wherein the number of the peaks A is 10 or less per 1,000 mm of the film width. [Claim 12]

The polymer piezoelectric film according to Claim 2, wherein the number of the peaks B is 10 or less per 1,000 mm of the film width. [Claim 13]

The polymer piezoelectric film according to Claim 2, wherein the number of the peaks B is eight or less per 1,000 mm of the film width."

### 3 Summary of Reasons for Opposition

The Opponent Mikio Suzuno submitted as evidence Japanese Unexamined Patent Application Publication No. 2014-27055 (hereinafter referred to as "Evidence A No. 1"), International Publication No. WO2012/026494 (hereinafter referred to as "Evidence A No. 2"), International Publication No. WO2013/054918 (hereinafter referred to as "Evidence A No. 3"), Japanese Unexamined Patent Application Publication No. 2014-86703 (hereinafter referred to as "Evidence A No. 4"), Japanese Unexamined Patent Application Publication No. 2014-93487 (hereinafter referred to as "Evidence A No. 5"), the Institute of Electrostatics, collection of papers 2011, 35th national convention of the Institute of Electrostatics, pp. 273-278 (hereinafter referred to as "Evidence A No. 6"), International Publication No. WO2014/168188 (hereinafter referred to as "Evidence A No. 7"), International Publication No. WO2014/119577 (hereinafter referred to as "Evidence A No. 8"), and alleges that the patents according to Claims 1 to 13 violate the provision of Article 29(1)(iii) and Article 29(2) of the Patent Act, and thus the patents according to Claims 1 to 13 should be revoked, and that the patents according to Claims 1 to 13 violate the provision of Article 36(6)(i) of the Patent Act, and thus the patents according to Claims 1 to 13 should be revoked.

#### 4 Description of Evidence A No. 1 to 8

(1) Evidence A No. 1 discloses an invention of "a monolayer film (see paragraph [0063] and Table 1 of Evidence A No. 1) having a thickness of 7  $\mu$ m and a thickness spot of 8% (see paragraph [0063] and Table 1) manufactured by a prescribed production condition (see paragraphs [0023] to [0029] and [0063]) comprising poly L-lactic acid having a weight average molecular weight (Mw) of 120,000 (see paragraph [0061])" (hereinafter referred to as "Invention A-1".)

(2) Evidence A No. 2 to Evidence A No. 5 disclose a technical matter of piezoelectric film having a degree of crystallization, a standardized molecular orientation MORc and an internal haze in the field of piezoelectric film of poly-lactic acid-based polymer,

Evidence A No. 6 discloses a technical matter of the relationship between a piezoelectric modulus and a number of lamination of a film of piezoelectric film, and Evidence A No. 7 and No. 8 disclose a technical matter of weight average molecular weight of carbodiimide compound used for a stabilizing material.

### 5 Judgment

(1) Determination of Article 29(1)(iii) and Article 29(2)

A The patent invention according to Claim 1

Comparing the patent invention according to Claim 1 with Evidence A-1 Invention, they differ from each other in that Evidence A-1 Invention fails to disclose that "in a waveform measured with an inline film thickness meter and representing a relationship between a position in a width direction on the film and a thickness of the film, a number of peaks A is 20 or less per 1,000 mm of a film width, wherein

the peaks A have a peak height of  $1.5 \ \mu m$  or more, and a peak slope of 0.000035 or more". Further, the different feature is not described in Evidence A No. 2 to Evidence A No. 8.

On the other hand, the Opponent alleges that when the manufacturing method of the patent invention according to Claim 1 and the manufacturing method of Invention A-1 are compared to each other, both methods comprise the same or a very similar condition of manufacturing method, and thus the patent invention according to Claim 1 is the same as Invention A-1 as a product produced, or even if there was a different feature, such different feature was easily conceivable by a person skilled in the art on the basis of Invention A-1 and the common technical knowledge.

However, the allegation is not reasonable, for the following reasons.

The first reason is that the "monolayer film" of Invention A-1 functions as a "polymer piezoelectric film" of the patent invention according to Claim 1 by a configuration of a multilayered film of 20 layers, which the Opponent neglected. It can be seen from the description of the number of layers of 20 in the paragraph [0064] and Table 1 of Evidence A No. 1 that the monolayer film of Invention A-1 is utilized as a piezoelectric film only after laminating 20 layers of the monolayer film. Nevertheless, the thickness and the shape of the "monolayer film" of Invention A-1 is used for comparison with a "polymer piezoelectric film" of the patent according to Claim 1. Therefore, the allegation is not acceptable due to the incorrect selection of a target for comparison.

The second reason is that the patent invention according to Claim 1 specifies a film profile in a film thickness direction with a focus on the factors of "peak height and slope of the thickness", whereas Invention A-1 specifies a film profile with a focus on the factor of thickness spot, which is an average information of the whole thickness of film. This different feature is improperly evaluated.

Regarding the different feature, the Opponent alleges that a difference between a maximum value and a minimum value is 0.56  $\mu$ m given the thickness of 7  $\mu$ m and the thickness spot of 8% in Evidence A No. 1, and thus there is no peak of 1.5  $\mu$ m or more, and Evidence A No. 1 discloses in the paragraph [0033] the case of using 2  $\mu$ m or 3  $\mu$ m film, and in such a case there can be no peak with a thickness of 1.5  $\mu$ m or more taking account of the common technical knowledge, and thus it makes an error to use a peak value of thickness for the assessment of film profile. However, regarding the film thickness, as noted in the aforementioned first reason, what becomes a target for comparison with the patent invention according to Claim 1 is a 20-layered film of Invention A-1 film, and thus the Allegation based on a film with a different target is not reasonable.

Further, the patent invention according to Claim 1 has a technical significance in view of the following description with regard to the fact that a peak value of thickness is used for the evaluation of film profile. First, the patent specification discloses in the paragraph [0016] that "Even when a film was produced so as to, e.g., decrease a standard deviation of thickness or a proportion dividing a difference between a maximum thickness and a minimum thickness with an average thickness (hereinafter referred to as thickness R%), both of which are one of the index representing a thickness variation, to improve the thickness variation, it was insufficient to improve the appearance problem. Furthermore, the studies by the present inventors revealed that it was difficult to sufficiently suppress the variation of piezoelectricity.

The standard deviation of thickness and thickness R% are average information of the whole thickness of film. A simple reduction of these values is not enough to reduce the appearance problem or the variation in piezoelectricity. Thus it is assumed that the waviness stems from the abrupt variation of film thickness." Therefore, to improve thickness variation, it is definitely described that a solution on the basis of "average information of the whole thickness of film" is not sufficient to obtain a sufficient means for the solution, but an attention should be paid to "the abrupt variation of film thickness". Subsequently, it discloses in paragraph [0017] that "Accordingly, the present inventors have intensively investigated and as a result focused on a peak height of thickness and the peak slope for suppressing the abrupt thickness variation that is supposed to cause the occurrence of waviness or variation in piezoelectricity. Further, a film is produced to make a thickness peak in a specific condition, thereby reducing a thickness variation of polymer piezoelectric film, improving the appearance problem, and obtaining a polymer piezoelectric film with reduced variation in piezoelectricity to complete the present invention." It definitely discloses focusing on "peak height and peak slope of thickness" as information of abrupt variation of film thickness.

Furthermore, the specification discloses in [Table 2] of the examples measuring a thickness variation R%, which can be also referred to as a thickness spot, and even if the value were small (Comparative Example 1 in the aforesaid [Table 2]), a variation  $\sigma$  of piezoelectric constant did not become small, and with a focus on the factor of "peak height and slope of thickness", controlling this factor to a certain condition demonstrated the effects of an improved variation  $\sigma$  of piezoelectric constant (Examples 1 to 3 in the aforesaid [Table 2]).

From the above description, there is a technical significance in the patent invention according to Claim 1 to use a peak height and a slope of the peak of thickness for the evaluation of a film profile from a viewpoint of improvement on the variation in piezoelectricity.

Therefore, the above Opponent's allegation is not reasonable for the reasons of the aforesaid No. 1 and No. 2.

Therefore, the patent invention according to Claim 1 is not invention described in Evidence A No. 1, nor it is easily conceivable by a person skilled in the art on the basis of the inventions described in Evidence A No. 1 to 8. B The patent inventions according to Claims 2 to 13

The patent inventions according to Claims 2 to 13 directly or indirectly depend from Claim 1 to further confine the scope of the patent invention according to Claim 1. Thus for a reason similar to the determination of the patent invention according to the aforesaid Claim 1, they are not inventions described in Evidence A No. 1, nor are they easily conceivable by a person skilled in the art on the basis of the aforesaid invention described in Evidence A No. 1 to No. 8.

### C Summary

For the above reasons, the patent inventions according to Claims 1 to 13 are not inventions described in Evidence A No. 1, nor are they easily conceivable by a person skilled in the art on the basis of the invention described in Evidence A No. 1 to 8.

### (2) Article 36(6)(i)

The Opponent alleges that the patent inventions according to Claims 1 to 13 only specify a height of a convex portion (and its slope) and the number without specifying the total thickness, but it is not enough to discuss a degree of thickness variation, and thus it corresponds to the case where it cannot be said that the Detailed Description of the Invention can be extended or generalized to the scope of the inventions according to Claims 1 to 13 in view of the common technical knowledge as of the filing date, and thus a patent was granted in violation of the provision of Article 36(6)(i).

The aforesaid allegation is that a technique to improve variation in piezoelectricity by reducing a thickness variation premises the estimation of a degree of thickness variation before the application of the technique; however, the estimation is insufficient.

However, as discussed in the aforesaid (1)A and B, in particular the aforesaid (1)A "Second reason", the patent inventions according to Claims 1 to 13 have a technical feature in that, to improve thickness variation, a solution on the basis of "average information of the whole thickness of film" is not sufficient to obtain a sufficient means for the solution, but attention should be paid to "the abrupt variation of film thickness".

Consequently, it cannot be recognized that the estimation of thickness variation is essential for the patent inventions according to Claims 1 to 13, since it focuses on "the abrupt change in film thickness". As a result, it cannot be recognized that the total thickness necessary for the estimation of thickness variation is essential. Therefore, the above Opponent's allegation is not reasonable.

### 6 Closing

Therefore, the patents according to Claims 1 to 13 cannot be revoked for the reasons and evidence submitted in the Opposition to the grant of a patent.

Further, there is no other reason to revoke the Patent according to Claims 1 to 13.

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

May 7, 2018

Chief administrative judge: Administrative judge: Administrative judge:

FUKAZAWA, Masashi OSHIMA, Yoichi KATO, Koichi