Decision on Opposition

Opposition No. 2017-701191

Patentee	MacDermid Enthone, Inc.
Patent Attorney	HIROTA, Koichi
Patent Attorney	NAGARE, Yoshihiro
Patent Attorney	MATSUDA, Naoko
Patent Attorney	YAMASHITA, Takeshi
Opponent	Atotech Deutschland GmbH
Patent Attorney	Felix-Reinhard, Einsel
Patent Attorney	SHINO, Ryoichi

The case of opposition to a granted patent of inventions regarding Patent No. 6148798 titled "AQUEOUS ELECTROLYTE COMPOSITION HAVING A REDUCED AIRBORNE EMISSION, METHOD, AND USE OF THIS COMPOSITION" has resulted in the following decision.

Conclusion

The correction of the description and the scope of claims of Patent No. 6148798 shall be approved as described in the corrected description and the corrected scope of claims attached to the written correction request as with Corrected claims [1 to 13], [14 to 18], and 19.

The patent for Claims 1, 3 to 7, 9, 10, and 12 to 19 of Patent No. 6148798 is to be revoked.

An opposition against the patent for Claims 2, 8, and 11 of Patent No. 6148798 shall be dismissed.

Reasons

No. 1 History of the procedures

The application of the patent for Claims 1 to 19 of Patent No. 6148798 (hereinafter, referred to as the "Patent") was based on an international application filed on September 5, 2014 (priority claim under the Paris Convention: received by the foreign receiving office on September 5, 2013, EP) and the establishment of the patent right thereof was registered on May 26, 2017. A gazette containing the Patent was published on June 14, 2017.

Thereafter, the opposition to the granted patent for Claims 1 to 19 was filed on December 14, 2017 by the patent opponent Atotech Deutschland Gesellschaft mit beschraenkter Haftung GmbH (hereinafter, referred to as the "Opponent"). Then, a notice of reasons for revocation dated March 19, 2018 was issued. In response to this, a written opinion together with a written correction request was submitted by the Patentee on June 22, 2018. After that, a notice of reasons for revocation (advance notice of decision) dated November 2, 2018 was notified. A written opinion was submitted on February 6, 2019 by the Patentee (hereinafter, referred to as "the Patentee's opinion") together with a written correction request (hereinafter, referred to as the "Correction Request"). Then, a written opinion was submitted on March 14, 2019 by the Opponent. After that, an inquiry was made to the Patentee on April 26, 2019. A written response was submitted by from the Patentee on April 26 (hereinafter, referred to as the "Written Response 1"). Another inquiry was made to the Patentee on June 25, 2019. A written response was submitted by the Patentee on July 22, 2019 (hereinafter, referred to as the "Written Response 2"). After that, another notice of reasons for revocation (advance notice of decision) was notified on August 29, 2019. In response, no written opinion has been submitted by the Patentee.

No. 2 Request for correction

1 Object of correction and contents of correction

The correction request submitted on June 21, 2018 has been deemed to be withdrawn under the provisions of Article 120-5(7) of the Patent Act because of the Correction Request submitted thereafter. Hereinafter, therefore, consideration is given to the latter Correction Request.

(1) Object of correction

Corrections by the Correction Request (hereinafter, referred to as "the Correction") are to seek corrections of the specification and the scope of claims of Japanese Patent No. 6148798 as described in the corrected description and corrected scope of claims attached to the Correction Request regarding claims 1 to 19. The details of the correction are as follows (corrected portions are underlined by the body):

(2) Contents of correction

A Correction A

As for Claim 1, "An aqueous electrolyte composition, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m" before the Correction is corrected to "An aqueous electrolyte composition, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, the surfactant is comprised in a concentration range of ≥0.0000001% by weight and ≤0.000002% by weight, and the composition is free of perfluorinated compounds."

Claims 3 to 6, 9, and 10, which cite Claim 1, are corrected in the same manner.

B Correction B

As for Claim 7, "An aqueous electrolyte composition, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m" before the Correction is corrected to "An aqueous electrolyte composition, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, the surfactant is comprised in a concentration range of ≥0.0000001% by weight and ≤0.000002% by weight, and the composition is free of perfluorinated compounds."

Claims 9, 10, 12, and 13, which cite Claim 7, are corrected in the same manner.

C Correction C

As for Claim 14, "A method for the deposition of a metal layer on a substrate surface, said method comprising the steps of: providing a substrate on which the metal layer should be deposited; providing an aqueous electrolyte composition according to any one of Claims 1 to 9; and bringing the aqueous electrolyte composition into contact with a surface of a substrate on which the metal layer should be deposited, wherein the step of providing the aqueous electrolyte composition comprises the steps of:" before the Correction is corrected to "A method for the deposition of a metal layer on a substrate surface, said method comprising the steps of: providing a substrate on which the metal layer should be deposited; providing an aqueous electrolyte composition; and bringing the aqueous electrolyte composition into contact with a surface of a substrate on which the metal layer should be deposited, wherein the aqueous electrolyte composition comprises: at least ions of the metal to be deposited; at least one surfactant partially fluorinated but not perfluorinated; an anti-foaming agent being a water based composition comprising at least one acid selected from the group consisting of hydrochloric acid, sulfuric acid, alkane sulfonic acid, phosphoric acid, phosphonic acid, malonic acid, malic acid, and lactic acid and at least one ester of a halogenated alcohol represented by the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, M ≤ 2N, and Z = 2N + 1 − M; and a sulfonic acid represented by the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, M ≤ 2N, and Z = 2N + 1 − M, wherein the surfactant is at least one surfactant represented by the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer 6 and ≤ 22, M ≤ 2N, Z = 2N + 1 − M, and X is F, Cl, or Br, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m, measured by making use of a bubble pressure tensiometer, the surfactant is comprised in the electrolyte composition in a concentration range of ≥0.0000001% by weight and ≤0.000002% by weight, and the electrolyte composition contains no perfluoro compound, wherein the step of providing the aqueous electrolyte composition." In addition, "adding the aqueous electrolyte composition to the base electrolyte to provide a dynamic surface tension of ≤ 35 mN/m" is corrected to "adding the aqueous electrolyte composition to the base electrolyte to provide a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer."

Claims 15 to 18, which cite Claim 14, are also corrected in a similar manner.

D Correction D

Claim 2 is deleted.

E Correction E

Claim 11 is deleted.

F Correction F

As for Claim 3, "The aqueous electrolyte composition according to any one of Claims 1 to 2" before the Correction is corrected to "The aqueous electrolyte composition according to Claim 1."

Claims 4 to 6, 9, and 10, which cite Claim 3, are also corrected in a similar manner.

G Correction G

As for Claim 6, "The aqueous electrolyte composition according to any one of Claims 1 to 5" before the Correction is corrected to "The aqueous electrolyte composition according to any one of Claims 1 and 3 to 5."

Claims 9, and 10, which cite Claim 6, are also corrected in a similar manner.

H Correction H

As for Claim 9, "The aqueous electrolyte composition according to any one of Claims 1 to 8" before the Correction is corrected to "The aqueous electrolyte composition according to any one of Claims 1 and 3 to 7."

Claim 10, which cites Claim 9 is also corrected in a similar manner.

I Correction I

As for Claim 10, "The aqueous electrolyte composition according to any one of Claims 1 to 9" before the Correction is corrected to "The aqueous electrolyte composition according to any one of Claims 1, 3 to 7, and 9."

J Correction J

As for Claim 12, "The electrolyte composition according to Claim 7, wherein the compound is present in a concentration ≥0.0000004% by weight and ≤0.0000015% by weight and is free of perfluorinated compounds." is corrected to "The electrolyte composition according to Claim 7, wherein the compound is present in a concentration ≥0.0000004% by weight and ≤0.0000015% by weight."

Claim 13, which cites Claim 12, is also corrected in a similar manner.

K Correction K

As for paragraph [0041] of the specification attached to the application (hereinafter, referred to "the Specification"), "added in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L, e.g., 0 mL/L, 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L." to "added in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L, e.g., 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L."

L Correction L

As for Claim 15, "the dynamic surface tension of the aqueous electrolyte composition" is corrected to "the dynamic surface tension of the aqueous electrolyte composition measured by making use of a bubble pressure tensiometer."

Claims 16 to 18, which cite Claim 15, are also corrected in a similar manner.

M Correction M

Claim 8 is deleted.

N Correction N

As for Claim 19, "Use of a surfactant composition in an electrolyte comprises at least one sulfonic acid " is corrected to "Use of a surfactant composition in an electrolyte comprises at least one sulfonic acid, wherein the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, the surfactant is comprised in a concentration range of ≥0.0000001% by weight and ≤0.000002% by weight, and the composition is free of perfluorinated compounds."

O Request for drawing up a group of claims

As for corrected Claim 14 and corrected Claims 15 which cite Claim 14, subject to approval for the correction of those Claims, Patentee requests that those Claims should be treated as another group of claims.

2 Judgement by the body

(1) Purpose of Correction, existence of substantial expansion or change of the scope of claims, and presence or absence of addition of new matters

A Regarding Correction A

Correction A is to add the matters of Claims 2 and 11 before the Correction to Claim 1 before the Correction and also specify the "dynamic surface tension," which is the matter specifying the Invention before the Correction, as one "measured by making use of a bubble pressure tensiometer" based on the description in paragraph [0021] of the Specification. Thus, Correction A aims at "restriction of the scope of claims" and does not substantially enlarge or modify the scope of claims. Therefore, Correction A is within the matters disclosed in the specification, scope of claims, and drawings attached to the application (hereinafter, referred to as the "Specification, etc.").

B Regarding Correction B

Correction B is to add the matters stated in Claims 2 and 11 before the Correction to Claim 7 before the Correction and also specify the "dynamic surface tension," which is the matter specifying the Invention before the Correction, as one "measured by making use of a bubble pressure tensiometer" based on the description in paragraph [0021] of the Specification. Thus, Correction B aims at "restriction of the scope of claims" and does not substantially enlarge or modify the scope of claims. Therefore, Correction B is within the matters disclosed in the Specification, etc.

C Regarding Correction C

As for "the aqueous electrolyte composition according to any one of Claims 1 to 9" of Claim 14 before the Correction, Correction C cancels the form of depending from Claims 1 to 9 before the Correction and then incorporates the matter specifying the Invention of the invention recited in Claim 6, which depends from any of Claims 1 to 4 before the Correction, into Claim 14, followed by addition of the matter of Claim 11 before the Correction. In addition, Correction C specifies the "dynamic surface tension," which is the matter specifying the Invention before the Correction, as one "measured by making use of a bubble pressure tensiometer" based on the description in paragraph [0021] of the Specification. Thus, Correction C aims at "restriction of the scope of claims" and "correction of a statement of claims which cites other statement of claims to the statement which does not cite said other statement of claims." In addition, Correction C does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

D　Regarding Correction D

Correction D deletes Claim 2 and thus aims at "restriction of the scope of claims."　In addition, Correction D does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

E　Regarding Correction E

Correction E deletes Claim 11 and thus aims at "restriction of the scope of claims."　In addition, Correction E does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

F　Regarding Corrections F to I

Along with the deletion of Claim 2 by the above Correction D and the deletion of Claim 8 by the above Correction M, each of Corrections F to I deletes Claims 2 and 8 from which the claim concerned depends.　Thus, each of them aims at "restriction of the scope of claims."　In addition, none of them substantially enlarges or modifies the scope of claims and therefore they are within the matters disclosed in the Specification, etc.

G　Regarding Correction J

Along with the addition of "free of perfluorinated compounds," which is the matter specifying the Invention, to Claim 7 by Correction B, Correction J is to delete the overlapped matter specifying the Invention from Claim 12, which depends from Claim 2.　Thus, Correction J aims at "clarification of an ambiguous description" and does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

H　Regarding Correction K

Paragraph [0041] of the Specification describes "added in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L, e.g., 0 mL/L, 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L" before the Correction.　However, the sentence includes "1 mL/L and 4 mL/L" and "e.g., 0 mL/L, 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L," which are inconsistent due to the presence of "0 mL/L" in the latter.　Then, Correction K allows the sentence to be free of "0 mL/L," after the Correction.　Thus, Correction K aims at "clarification of an ambiguous description" and does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

In addition, since Correction K, which is a correction of the specification, corrects the descriptions in the specification corresponding to Claims 1 to 19 before the Correction, the correction of the specification related to the Correction Request is made with respect to all the claims.

I　Regarding Correction L

As for Claim 15 before the Correction, Correction L specifies the "dynamic surface tension," which is the matter specifying the Invention before the Correction, as one "measured by making use of a bubble pressure tensiometer" based on the description in paragraph [0021] of the Specification.　Thus, Correction L aims at "restriction of the scope of claims" and does not substantially enlarge or modify the scope of claims. Therefore, Correction L is within the matters disclosed in the Specification, etc.

J Regarding Correction M

Correction M deletes Claim 8 and thus aims at "restriction of the scope of claims" and does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

K Regarding Correction N

Correction N is to add the matter specifying the Invention of Claims 2 and 11 before the Correction to Claim 19 before the Correction and also specifies that "the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer," based on the recitation in Claim 1 and the description in paragraph [0021] of the Specification. Thus, Correction N aims at "restriction of the scope of claims" and does not substantially enlarge or modify the scope of claims and is therefore within the matters disclosed in the Specification, etc.

L As stated above, Corrections A to N are intended for "restriction of the scope of claims" prescribed in Article 120-5(2) (i) of the Patent Act, "clarification of an ambiguous description" prescribed in Article 120-5(2)(iii) of the Patent Act, or "correction of a statement of claims which cites another statement of claims to a statement which does not cite said other statement of claims" prescribed in Article 120-5(2)(iv) of the Patent Act. In addition, these corrections do not substantially enlarge or modify the scope of claims and are therefore within the matters disclosed in the Specification, etc., and thus fall under the provisions of Article 126(6) of the Patent Act, which is applied mutatis mutandis pursuant to the provisions of Article 120-5(9) of the Patent Act. Furthermore, those corrections are made on all claims relating to the correction of the Specification and thus fall under the provisions of Article 126(4) of the Patent Act, which is applied mutatis mutandis pursuant to the provisions of Article 120-5(9) of the Patent Act.

(2) Requirements for being independently patentable

As for the present case, an opposition to the granted patent of all the claims before correction has been filed. Thus, Claims 1 to 14 are not subjected to Article 126(7) of the Patent Act, which is applied mutatis mutandis pursuant to the provisions of Article 120-5(9) of the Patent Act.

(3) Group of claims

Claims 2 to 6, 8 to 11, and 14 to 18 before the Correction depend from Claim 1, and Claims 8 to 18 before the Correction depend from Claim 8. Thus, Claims 1 to 18 before the Correction are a group of claims.

At the same time, the Correction is intended for dissolving a citation relation between Claim 14 and Claims 1 to 9. In addition, as for Claim 14 and Claims 15 to 18, which depend from Claim 14, an approved correction to Claim 14 makes Claims 15 to 18 another correction unit.

Corrections C and L, which are the matters of correction for Claim 14 and

Claims 15 to 18, which depend from Claim 14, are admitted as examined in the above 2(1), C and I, making Claims 14 to 18 another correction unit. Therefore, in the Correction, Claims [1 to 13], [14 to 18], and 19 serve as other correction units.

5 Remarks of the Correction

As stated above, all the corrections according to the Correction made by the Patentee on February 6, 2019 aim at the provision of Article 120-5(2)(i), (ii), or (iv) and fall under the provisions of Article 126(4), (5), and (6) of the Patent Act, which is applied mutatis mutandis pursuant to the provisions of Article 120-5(9) of the Patent Act. Therefore, Claims [1 to 13], [14 to 18], and 19 of the scope of claims are allowed to be corrected as concluded.

No. 3 Regarding opposition to granted patent

1 The Invention

Corrections for Claims 1 to 19 made by the Patentee on June 21, 2018 are legitimate as discussed in the above No. 2. Thus, the inventions recited in Claims 1 to 19 of the scope of the claims (hereinafter, referred to as "Invention 1" to "Invention 19," respectively; in addition, all of them are collectively referred to as "the Invention") are specified by the following matters recited in Claims 1 to 19 of the scope of the claims attached to the written correction request for the Correction.

"[Claim 1]

"An aqueous electrolyte composition for the deposition of a metal layer on a substrate surface, the composition comprising:

at least ions of the metal to be deposited; and

at least one surfactant partially fluorinated but not perfluorinated, wherein

the surfactant is at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, M is ≤ 2N, Z = 2N + 1 − M, and X is F, Cl, or Br,

the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and the surfactant is comprised in a concentration range of ≥ 0.0000001% by weight and ≤ 0.000002% by weight, wherein

the composition is free of perfluorinated compounds.

[Claim 2]

(Deleted)

[Claim 3]

The aqueous electrolyte composition according to Claim 1, wherein the composition comprises an anti-foaming agent.

[Claim 4]

The aqueous electrolyte composition according to Claim 3, wherein the anti-foaming agent is a water based composition comprising: at least one acid selected from the group consisting of hydrochloric acid, sulfuric acid, alkane sulfonic acid, phosphoric acid, phosphonic acid, malonic acid, malic acid, and lactic acid; and at least one ester of a halogenated alcohol represented by the general formula $C_NF_MH_ZOH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, M ≤ 2N, and Z = 2N + 1 − M.

[Claim 5]

The aqueous electrolyte composition according to Claim 4, wherein the anti-foaming agent is comprised in a concentration range of ≥0.0001% by weight and ≤

0.005% by weight.

[Claim 6]

The electrolyte according to any one of Claims 1 and 3 to 5, wherein the composition comprises a sulfonic acid according to the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, and Z = 2N + 1 − M.

[Claim 7]

An aqueous electrolyte composition for the deposition of a metal layer on a substrate surface, the composition comprising:

at least ions of the metal to be deposited;

at least one surfactant partially fluorinated but not perfluorinated; and

a sulfonic acid according to the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, and Z = 2N + 1 − M, wherein

the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and

the surfactant is comprised in a concentration range of ≥ 0.0000001% by weight and ≤ 0.000002% by weight, wherein

the composition is free of perfluorinated compounds

[Claim 8]

(Deleted)

[Claim 9]

The aqueous electrolyte composition according to at least one of Claims 1 and 3 to 7, wherein the metal to be deposited and of which ions are comprised in the electrolyte composition is at least one metal selected from the group consisting of Cu, Ni, Cr, Ag, Au, Pt, Zn, Fe, In, Ga, W, Se, Te, Mn, Bi, Co, Sn, and Cd.

[Claim 10]

The aqueous electrolyte composition according to Claim 7, wherein the metal ions are Cr ions.

[Claim 11]

(Deleted)

[Claim 12]

The aqueous electrolyte composition according to Claim 7, comprising:

a compound of the general formula $C_NF_MH_ZSO_2X$ as the partially fluorinated surfactant, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, Z = 2N + 1 − M, and X is one of F, Cl, or Br; and

Zn ions or Cr ions as the metal ions,

wherein the compound is present in a concentration ≥ 0.0000004% by weight and ≤ 0.0000015% by weight.

[Claim 13]

The aqueous electrolyte composition according to Claim 12, wherein the partially fluorinated surfactant is 3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride.

[Claim 14]

A method for the deposition of a metal layer on a substrate surface, the method comprising the steps of:

providing a substrate on which the metal layer should be deposited;

providing an aqueous electrolyte composition; and bringing the aqueous electrolyte composition into contact with a surface of a substrate on which the metal layer should be deposited, wherein

the aqueous electrolyte composition comprises:

at least ions of the metal to be deposited;

at least one surfactant partially fluorinated but not perfluorinated;

an anti-foaming agent being a water based composition comprising at least one acid selected from the group consisting of hydrochloric acid, sulfuric acid, alkane sulfonic acid, phosphoric acid, phosphonic acid, malonic acid, malic acid, and lactic acid and at least one ester of a halogenated alcohol represented by the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, $M \leq 2N$, and $Z = 2N + 1 - M$; and

sulfonic acid according to the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, $M \leq 2N$, and $Z = 2N + 1 - M$, wherein the surfactant is at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, M is ≤ 2N, $Z = 2N + 1 - M$, and X is F, Cl, or Br, wherein N is an integer ≥ 6 and ≤ 22, $M \leq 2N$, $Z = 2N + 1 - M$, and X is one of F, Cl, or Br,

the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and

the surfactant is comprised in a concentration range between ≥ 0.0000001% by weight and ≤ 0.000002% by weight, wherein

the composition is free of perfluorinated compounds, wherein

the step of providing the aqueous electrolyte composition comprises the steps of:

providing an aqueous base electrolyte, the base electrolyte comprising at least ions of the metal to be deposited in a concentration sufficient to enable a metal layer deposition; and

adding to said base electrolyte an aqueous surfactant composition, wherein said surfactant composition comprises at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, $M \leq 2N$, $Z = 2N + 1 - M$, and X is one of F, Cl, or Br, and at least one anti-foaming agent being a water based composition comprising at least one acid selected from the group consisting of hydrochloric acid, sulfuric acid, alkane sulfonic acid, phosphoric acid, phosphonic acid, malonic acid, malic acid, and lactic acid, and at least one ester of a halogenated alcohol represented by the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, $M \leq 2N$, and $Z = 2N + 1 - M$, and at least one sulfonic acid according to the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, $M \leq 2N$, and $Z = 2N + 1 - M$, wherein the aqueous surfactant composition is added to the base electrolyte to provide a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer.

[Claim 15]

The method according to Claim 14, wherein the method comprises the step of maintaining the dynamic surface tension of the aqueous electrolyte composition at a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer by addition of the aqueous surfactant composition.

[Claim 16]

The method according to any one of Claims 14 and 15, wherein the metal to be deposited is at least one metal selected from the group consisting of Cu, Ni, Cr, Ag, Au, Pt, Zn, Fe, In, Ga, W, Se, Te, Mn, Bi, Co, Sn, and Cd.

[Claim 17]

The method according to any one of Claims 14 to 16, wherein the deposition is performed autocatalytically by addition of at least one reduction agent to the base electrolyte.

[Claim 18]

The method according to any one of Claims 14 to 16, wherein the deposition is performed galvanically by applying a current between the substrate and an anode.

[Claim 19]

Use of a surfactant composition in an electrolyte for the deposition of at least one metal selected from the group consisting of Cu, Ni, Cr, Ag, Au, Pt, Zn, Fe, In, Ga, W, Se, Te, Mn, Bi, Co, Sn, and Cd,

wherein said surfactant composition comprises at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, Z = 2N + 1 − M, and X is one of F, Cl, or Br, at least one acid selected from the group consisting of hydrochloric acid, sulfuric acid, alkane sulfonic acid, phosphoric acid, phosphonic acid, malonic acid, malic acid, and lactic acid, and at least one ester of a halogenated alcohol represented by the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, X is F, Cl, or Br, M ≤ 2N, and Z = 2N + 1 − M and at least one sulfonic acid according to the general formula $C_NF_MH_ZSO_2OH$, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, and Z = 2N + 1 − M, wherein

the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, wherein

the surfactant is comprised in a concentration range between ≥ 0.0000001% by weight and ≤ 0.000002% by weight, and wherein

the composition is free of perfluorinated compounds."

2. Summary of reasons for revocation

2-1 Gist of reasons for revocation noticed to the Patentee as of March 19, 2018

(1) Regarding Article 36(6)(ii) of the Patent Act (requirements for clarity)

A In the scope of claims attached to the application, Claims 1 and 7 recite "a dynamic surface tension of the composition of ≤ 35 mN/m," and Claim 14 recites "a dynamic surface tension of ≤ 35 mN/m." However, no details of specific measurement conditions for the "dynamic surface tension" are recited in these claims. In addition, it cannot be acknowledged that a person skilled in the art would have a common understanding that a specific measurement condition is always adopted when no measurement condition is concretely described. Therefore the inventions recited in Claims 1, 7, and 14 are indefinite and also the inventions recited in Claims 2 to 6, 8 to 13, and 15 to 18, which cite these claims, are indefinite.

Therefore, the patent for Inventions 1 to 18 has been granted on a patent application not complying with the requirements under the provision of Article 36(6)(ii) of the Patent Act.

B In the scope of claims attached to the application, the recitation "the aqueous electrolyte composition according to any one of Claims 1 to 9" in Claim 14 is not consistent with the "aqueous electrolyte composition" specifically recited in Claim 14. It is not possible to grasp what is contained as a component constituting the "aqueous electrolyte composition" of Claim 14. Therefore, the invention recited in Claim 14 is indefinite.

Therefore, the patent for Claim 14 has been granted on a patent application not complying with the requirements as provided in Article 36(5)(ii) of the Patent Act.

(2) Regarding Article 36(6)(i) of the Patent Act (requirements for support)

A The "surfactant" specified in Claims 1 and 7 of the scope of claims attached to the application is "comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m." However, in the examples of the Specification, only Example 3 specifically describes the "surfactant." It is unclear whether or not the "aqueous electrolyte composition" of Example 3 is "comprised in a concentration effecting a dynamic surface tension of ≤ 35 mN/m." The same is also applied to Claim 14.

Then, the Specification can be said to include no description that the inventions recited in Claims 1, 7, and 14 can solve the problem. Thus, the inventions recited in Claims 1, 7, and 14 are not disclosed in the Detailed Description of the Invention in the Specification and do not comply with the requirement under Article 36(6)(i) of the Patent Act.

Therefore, the patent for Claims 1, 7, and 14 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act.

B The "concentration range" of the "surfactant" specified in Claim 2, the "concentration range" of the "sulfonic acid" specified in Claim 8, and the "concentration range" of the "compound" specified in Claim 12 of the scope of claims attached in the application are not described in the examples of the Specification. In other words, the Specification does not describe that the "concentration range" of each of them allows the Invention to exert its effect. Therefore, the inventions recited in Claims 2, 8, 12, and 13 are not disclosed in the Detailed Description of the Specification for the Patent and do not comply with the requirements as provided in Article 36(6)(i) of the Patent Act.

Therefore, the patent for Claims 2, 8, 12, and 13 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act.

C Example 3 of the Specification describes an example in which the "surfactant" specified in each of Claims 1 to 19 of the scope of claims attached to the application is added in amount of "0 mL/L" and describes that the effect of the Invention is exerted even in this example.

Furthermore, Example 4 of the Specification describes one that does not exert the effect of the Invention even though it is included in the invention recited in Claim 1.

Thus, it is unclear what kind of invention solves the problem of the Invention. It cannot be said that the inventions recited in Claims 1 to 19 are disclosed in the Detailed Description of the Invention in the Specification for the Patent and do not comply with the requirements as provided in Article 36(6)(i) of the Patent Act.

Therefore, the patent for Claims 1 to 19 have been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act.

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

Examples 1, 3, and 4 of the Specification describe no substantial feature of the "ANKOR 1127 make up solution." Therefore, the Detailed Description of the Invention for the Patent is not clearly and sufficiently described as to enable a person ordinarily skilled in the art to work the inventions recited in Claims 1 to 19 of the scope of claims attached to the application and thus does not comply with the requirements as provided in Article 36(4)(i) of the Patent Act.

Therefore, the patent for Claim 14 has been granted on a patent application not complying with the requirements as provided in Article 36(5)(ii) of the Patent Act.

(4) Regarding Article 29(2) of the Patent Act (inventive step)

the inventions recited in Claims 1, 6, and 7 of the scope of the claims attached to the application could be easily made by a person skilled in the art based on the invention disclosed in Evidence A No. 2 and the described matters in Evidence A No. 4. Therefore, the Appellant should not be granted a patent for the invention in accordance with the provisions of Article 29(2) of the Patent Act.

Also, the inventions recited in Claims 3 to 5, 9 to 11, 14 to 16, and 18 of the scope of the claims attached to the application could be easily made by a person skilled in the art based on the invention disclosed in Evidence A No. 2 and the described matters in Evidence A Nos. 4 and 10. Therefore, the Appellant should not be granted a patent for the invention in accordance with the provisions of Article 29(2) of the Patent Act.

Furthermore, the invention recited in Claim 17 of the scope of the claims attached to the application could be easily made by a person skilled in the art based on the invention disclosed in Evidence A No. 2 and the described matters in Evidence A Nos. 4, 10, and 12. Therefore, the Appellant should not be granted a patent for the invention in accordance with the provisions of Article 29(2) of the Patent Act.

Moreover, the invention recited in Claim 19 could be easily made by a person skilled in the art based on the invention disclosed in Evidence A No. 2 and the described matters in Evidence A No. 10. Therefore, the Appellant should not be granted a patent for the invention in accordance with the provisions of Article 29(2) of the Patent Act.

Hence, the patent has been granted for Claims 1, 3 to 7, 9 to 11, and 14 to 19 contrary to the provisions of Article 29(2) of the Patent Act.

<Cited Documents>

Evidence A No. 2: DuPont de Nemours, Inc., Capstone FS-10 Technical information (July 2008)

Evidence A No. 3: DuPont de Nemours, Inc., Capstone FS-10 SAFETY DATA SHEET (April 8, 2011)

Evidence A No. 4: FEDERAL REGISTER (Vol. 77, No. 182, September 19, 2012)

Evidence A No. 10: Japanese Patent Application No. 2003-29298

Evidence A No. 12: Encyclopedia Dictionary of Chemistry 9, page 78 (30th edition issued on February 15, 1987)

2-2 Summary of reasons for revocation noticed to the patentee as of March 19,2018
(1) Regarding Article 36(6)(ii) of the Patent Act (requirements for clarity)
A Claims 1 and 7 as corrected by the Correction Request as of June 21, 2018 recite "a dynamic surface tension of the composition of ≤ 35 mN/m," and Claim 14 as corrected thereby recites "a dynamic surface tension of ≤ 35 mN/m." However, no details of specific measurement conditions for the "dynamic surface tension" can be recited in these claims. In addition, it cannot be acknowledged that a person skilled in the art would have a common understanding that it is normal to adopt a specific measurement condition when no measurement condition is concretely described. Therefore the inventions recited in Claims 1, 7, and 14 are indefinite and also the inventions recited in Claims 3 to 6, 8 to 10, 12, 13, and 15 to 18, which depend from these claims, are indefinite.

Therefore, the patent for Claims 1, 3 to 10, and 12 to 18 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(ii) of the Patent Act (the same as the above 2-1(1)A).

(2) Regarding Article 36(6)(i) of the Patent Act (requirements for support)
A The "surfactant" specified in Claims 1 and 7 as corrected by the Correction Request as of June 21, 2018 is "comprised in a concentration effecting a dynamic surface tension of the electrolyte composition of ≤ 35 mN/m." However, in the examples of the Specification, only Example 3 specifically describes the "surfactant." It is unclear whether or not the "electrolyte composition" of Example 3 is "comprised in a concentration effecting a dynamic surface tension of ≤ 35 mN/m." The same is also applied to Claim 14.

In addition, the "concentration range" of the "surfactant" specified in each of Claims 1, 7 and 14, the "concentration range" of the "sulfonic acid" specified in Claim 8, and the "concentration range" of the "compound" specified in Claim 12 are not described in the examples of the Specification. In other words, the Specification does not describe that the "concentration range" of each of them allows the Invention to exert its effect.

Then, the Specification can be said to include no description that the inventions recited in Claims 1, 7, 8, 12, and 14 can solve the problem. Thus, the inventions recited in Claims 2 to 6, 9, 10, 13, and 15 to 18 are not disclosed in the Detailed Description of the Invention in the Specification and do not comply with the requirement under Article 36(6)(i) of the Patent Act.

Therefore, the patent for Claims 1, 3 to 10, and 12 to 18 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act (the same as the above 2-1(2)A and B).

B It cannot be said that the invention recited in Claim 19 as corrected by the Correction Request as of June 21, 2018 is capable of solving the problem of the Invention, because it does not specify the dynamic surface tension of the electrolyte at all. Thus, the invention recited in Claim 19 as corrected is not disclosed in the Detailed Description of the Invention in the Specification and does not comply with the requirement under Article 36(6)(i) of the Patent Act.

Therefore, the patent for Claim 19 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act.

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

The invention recited in Claim 1 as corrected by the Correction Request as of June 21, 2018 includes the matter that "the surfactant is comprised in a concentration range ≥ 0.0000001% by weight and ≤ 0.000002% by weight." However, it cannot be said that the Detailed Description of the Invention in the Specification describes how the addition of the "surfactant" in "a concentration range ≥0.0000001% by weight and ≤0.000002% by weight" allows the "aqueous electrolyte composition" to have "a dynamic surface tension of ≤ 35 mN/m."

The same is also applied to the inventions recited in Claims 7 and 14 and Claims 3 to 6, 8 to 10, 12, 13, and 15 to 18, which depend from Claims 1, 7, and 14, as corrected by the Correction Request as of June 21, 2018.

As for the inventions recited in Claim 1, 3 to 10, and 12 to 18, the descriptions in the Detailed Description of the Invention in the Specification have been made in a patent application not complying with the requirements as provided in Article 36(4)(i) of the Patent Act.

3 Descriptions in the Specification

The Specification and drawings as corrected by the Correction Request include the following descriptions:

(1) Descriptions in the Detailed Description of the Invention

"[Technical Field]

[0001]

The present invention relates to an aqueous electrolyte composition for the deposition of a metal layer on a substrate surface, said aqueous electrolyte composition having a reduced airborne emission. Furthermore, the invention relates to a method for the deposition of a metal layer on a substrate surface in which method the formation of airborne emissions is reduced."

"[Summary of Invention]

[0014]

However, all of the attempts taken in the state of the art show various drawbacks, e.g., environmental shortcomings of the surfactants used. It is therefore an object of the invention to provide an improved aqueous electrolyte composition for the deposition of a metal layer on a substrate surface reducing airborne emission."

"[Description of Embodiments]

[0018]

Hence, an aqueous electrolyte composition for the deposition of a metal layer on a substrate surface is provided, said composition comprising at least ions of the metal to be deposited and at least one surfactant, wherein the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤35 mN/m, preferably <33 mN/m, most preferably ≤30 mN/m.

[0019]

Surprisingly, it was found that the dynamic surface tension of a composition influences the formation of airborne emissions. It was found that setting the dynamic surface tension of the composition to a value ≤35 mN/m significantly reduces the formation of airborne emission so that hazardous mists can be reduced or even avoided. The airborne emission is caused by gas bubbles created at the electrodes which arise to the surface of the electrolyte. At the surface, these bubbles expand above the liquid and break, thereby releasing entrapped gas into the atmosphere. The liquid in the gas bubble wall just before it breaks is made up of the electrolyte solution. As the liquid wall ruptures, it disintegrates into extremely small droplets that readily become airborne. The macroscopic effect of this procedure is to create a corrosive mist above the plating tank. Such mist can readily migrate throughout the workplace.

[0020]

By reducing the dynamic surface tension of the electrolyte composition to a value 35 mN/m or below, the gas bubbles produced at the electrodes become very small. Due to the reduction of the size of the gas bubbles the liquid wall of the bubbles becomes much thinner, which in turn leads to reduced forces when the bubbles disintegrate on the surface of the electrolyte composition. While not being bound to this theory, the Applicant believes that this reduced force at the time of disintegration on one hand together with a reduced amount of liquid in the liquid wall of the bubbles on the other hand causes the beneficial effect of reduction or avoidance of airborne emission.

[0021]

The dynamic surface tension relevant for the aqueous electrolyte composition may be measured by a method known as bubble pressure tensiometry making use of a bubble pressure tensiometer. In a bubble pressure tensiometer, gas bubbles are produced at a defined bubble formation rate in the solution to be analyzed. The gas bubbles are introduced into the solution by a capillary having a known radius. The pressure within the capillary is measured. During the process the pressure will pass a maximum which will be recognized by the system. This detection method is highly comparable to the effects of gas formation during an electrolytic plating process and therefore most relevant to the question of avoidance of airborne emission."

"[0024]

In a preferred embodiment of the invention the dynamic surface tension of the composition is measured at standard temperature; i.e., 20°C."

"[Examples]

[0038]

Example 1

To a base electrolyte consisting of 300 g/L chromic acid, 3.75 g/L sulfate (added as sulfuric acid), and 50 milliliters of a catalyst (ANKOR 1127 make up solution, available from Enthone Inc.), methane disulfonic acid was added in various concentrations; i.e., 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L. The dynamic surface tension of the resulting mixture was measured by a bubble pressure tensiometer at 20°C. The results are shown in FIG. 1.

[0039]

FIG. 1 shows the result of a measurement made under as of a bubble pressure tensiometer (SITA science line t60) at 20°C. The bubble lifetime is measured. That allows calculating the dynamic surface tension. Surface tension is created through the attraction of the molecules in liquids to each other. If one views a molecule at the interior of a medium, it would be equally attracted by all neighboring molecules. The effect is that it is attracted to all sides with the same force, so that the resulting force is zero. On the other hand, if a molecule is located at the surface of a liquid, the attraction from the interior of the medium works further on the one side, whereas there are no more molecules from the other side. Hence the resulting force is directed towards the interior of the liquid. On the microscopic scale this causes drops of liquid to be round, since this minimizes the surface of the liquid. Therefore, surface tension is defined as the energy needed to increase the surface by a defined value, whereby the minimum surface corresponds to the minimum energy. Through the attraction between the molecules of the testing liquid, air bubbles within the liquid are also subject to these forces; i.e., a bubble formed within a liquid is being compressed by the surface tension. The resulting pressure rises with the decreasing bubble radius. This increased pressure, in comparison to the outside of the bubble, is used to measure surface tension. Air is pumped through a capillary into a liquid. The surface of the bubble so created bulges and the bubble radius continuously decreases. During this process the pressure rises to a maximum at which the bubble has its smallest radius. This radius equals the radius of the capillary and forms a half sphere. After passing this point the bubble bursts and breaks away from the capillary. Now, a new bubble can form at the tip of the capillary. During this process the characteristic course of pressure in the bubble can be measured. From this characteristic course of pressure the surface tension can be calculated.

[0040]

Example 2

An electroless nickel bath with 15 g/L nickel, 40 g/L sodium hypophosphite, 35 g/L hydroxy carboxylic acid (e.g. lactic acid), 2.5 g/L hydroxy polycarboxylic acid (e.g. malonic acid), 1 g/L potassium iodide, and 0.5 mg/L stabilizer (antimony, added as antimony chloride) was used and 0.0008% by weight anti-foaming agent was added. No airborne emission by the evolved hydrogen was observed.

[0041]

Example 3

To a base electrolyte consisting of 300 g/L chromic acid, 3.75 g/L sulfate (added as sulfuric acid), and 50 mL/L of a catalyst (ANKOR 1127 make up solution, available from Enthone Inc.), 3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride was added in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L, e.g., 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L. No airborne emission by the evolved hydrogen was observed when using the electrolyte in a chromium plating process.

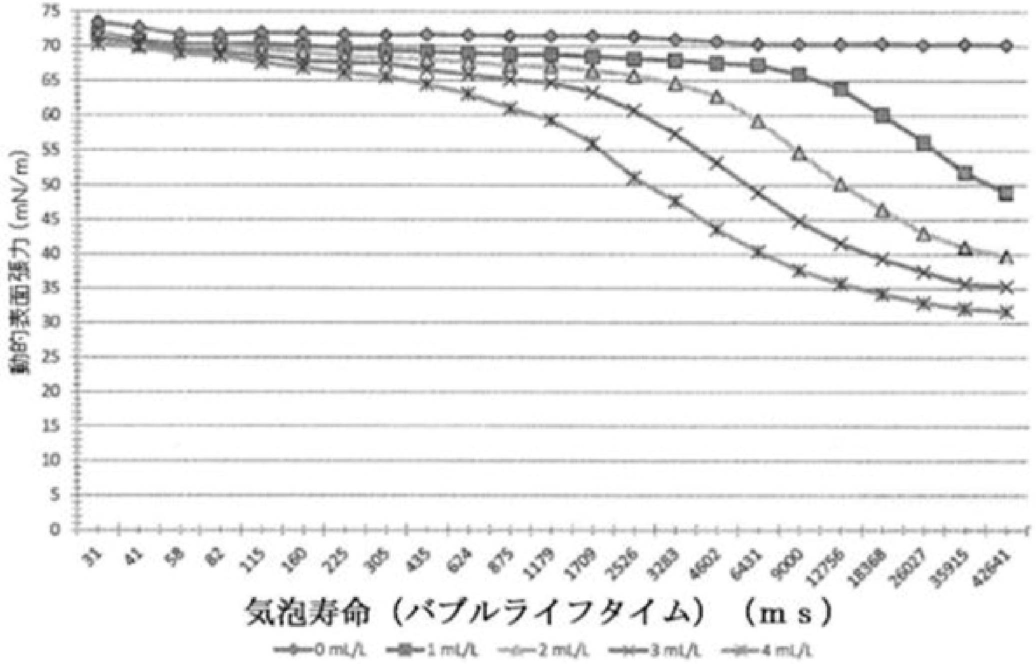
[0042]

Example 4 (Comparison)

To a base electrolyte consisting of 300 g/L chromic acid, 3.75 g/L sulfate (added as sulfuric acid), and 50 mL/L of a catalyst (ANKOR 1127 make up solution, available from Enthone Inc.), 3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride was added in various concentrations up to about 4 mL/L. Additionally, a further surfactant was added, e.g. a perfluorated phosphonic acid ester at a concentration of 8 mL/L. The dynamic surface tension of the resulting mixture was measured by a bubble pressure tensiometer at 20°C. Significant airborne emission observed by the evolved hydrogen was observed when using the electrolyte in a chromium plating process.

(2) Descriptions in drawings

"[FIG. 1]



動的表面張力	Dynamic surface tension
気泡寿命（バブルライフタイム）	Bubble lifetime

"

4. Judgment by the body regarding Revocation reasons that have not yet been resolved

(1) Regarding Article 36(6)(ii) of the Patent Act (requirements for clarity)

A Claims 1, 7, and 19 recite "a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer," Claim 14 recites "a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer" and "a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer," and Claim 15 recites "the step of maintaining the dynamic surface tension of the aqueous electrolyte composition at a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer "

B Here, according to the common general technical knowledge, the dynamic surface tension is the surface tension in the non-equilibrium state and the magnitude thereof varies depending on the measurement conditions (e.g., the graph showing the relationship between time and surface tension represented on page 4 of Evidence A No. 11 (see the reference diagram below)). Furthermore, the measurement of dynamic surface tension with a "bubble pressure tensiometer" is mentioned in paragraphs [0038] and [0039] of the Specification and the results thereof are represented in FIG. 1. As shown in Fig. 1, it can be found that the "dynamic surface tension" varies depending on the "bubble lifetime," but the specification does not state what value to set the bubble lifetime when measuring dynamic surface tension. Thus, the dynamic surface tension cannot be uniquely specified.

C With regard to this point, the patentee states in Written Response 1 as follows: "A dynamic surface tension of ≤ 35 mN / m" in the corrected scope of claims is interpreted as "a dynamic surface tension of ≤ 35 mN/m" at a specific bubble lifetime; i.e., a predetermined bubble lifetime. In other words, it means that "a dynamic surface tension of ≤ 35 mN/m" at the bubble lifetime (42641 ms) as shown in FIG. 1 of the application for the Patent (see the Written Response 1, page 1, 4, 4-1).

D However, in Fig. 1 of this case, the bubble lifetime is represented by any of 23 numerical values, including "42641 ms." Even if the descriptions in the Specification are taken into consideration, it is not clear that the "dynamic surface tension" recited in each of Claims 1, 7, 14, 15, and 19 among these numerical values is the dynamic surface tension at a bubble lifetime of "42641 ms."

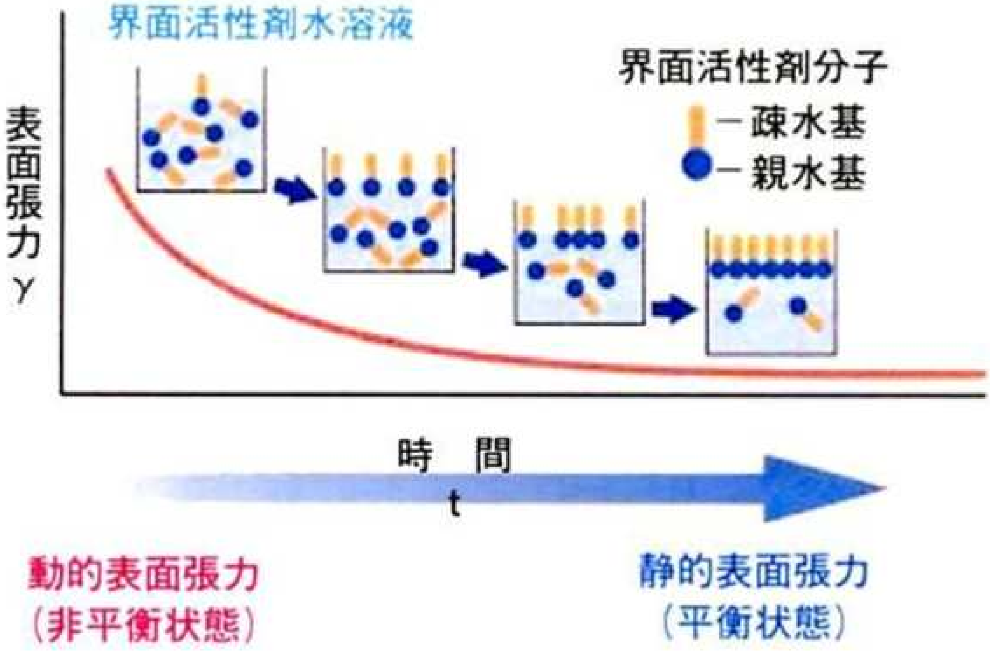
E Furthermore, it cannot be recognized that a person skilled in the art could have a common recognition to adopt the "dynamic surface tension" at a bubble lifetime of "42641 ms" when the condition for bubble lifetime was not stated at the time of measuring dynamic surface tension.

F Thus, a person skilled in the art could not grasp under what conditions the "dynamic surface tension" recited in each of the above Claims 1, 7, 14, 15, and 19 was measured.

G Furthermore, Inventions 3 to 6, 9, 10, 12, 13, and 16 to 18, which depend from these inventions, are also unclear.

H Therefore, the patent for Claims 1, 3 to 7, 9, 10, and 12 to 19 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(ii) of the Patent Act.

(Reference diagram)



表面張力 γ	Surface tension γ
界面活性剤水溶液	Aqueous surfactant solution

時間 t	Time t
動的表面張力（非平衡状態）	Dynamic surface tension (non-equilibrium state)
界面活性剤分子	Surfactant molecule
疎水基	Hydrophobic group
親水基	Hydrophilic group
静的表面張力（平衡状態）	Static surface tension (equilibrium state)

(2) Regarding Article 36(4)(i) of the Patent Act (enablement requirement)

A The matters specifying the Invention are "the surfactant is at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, M is ≤ 2N, Z = 2N + 1 − M, and X is F, Cl, or Br, the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, the surfactant is comprised in a concentration range ≥0.0000001% by weight and ≤0.000002% by weight, and the composition is free of perfluorinated compounds" in Inventions 1 and 14; "comprising: at least one surfactant partially fluorinated but not perfluorinated" and "the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and the surfactant is comprised in a concentration range ≥ 0.0000001% by weight and ≤ 0.000002% by weight" in Invention 7; and "said surfactant composition comprises at least one surfactant of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, M ≤ 2N, Z = 2N + 1 − M, and X is one of F, Cl, or Br" and " the surfactant is comprised in a concentration effecting a dynamic surface tension of the composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and the surfactant is comprised in a concentration range ≥ 0.0000001% by weight and ≤ 0.000002% by weight, wherein the composition is free of perfluorinated compounds" in Invention 19.

B On the other hand, in Example 1 in paragraphs [0038] and [0039] of the Specification as corrected by the Correction, FIG. 1 represents the bubble lifetime and dynamic surface tension of the electrolyte when methane disulfonic acid was added at concentrations of 0 mL/L, 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L to the base electrolyte (see the above 3(2)).

C Here, the methane disulfonic acid in the above B does not correspond to the "surfactant" in each of Inventions 1, 14, and 19, because it is not represented by "the general formula $C_NF_MH_ZSO_2X$," and also does not correspond to the "surfactant" in Invention 7 because of not being "partially fluorinated." According to FIG. 1 in the above B, a dynamic surface tension of 35 mN/m cannot be attained when the surfactant has a concentration of 0 mL/L, 1 mL/L, or 2 mL/L. When the surfactant has a concentration of 3 mL/m, the electrolyte composition can be allowed to have a dynamic surface tension of ≤ 35 mN/m at a bubble lifetime exceeding approximately 36000 ms. When the surfactant has a concentration of 4 mL/m, the electrolyte composition can be allowed to have a dynamic surface tension of ≤ 35 mN/m at a bubble lifetime region of exceeding approximately 13000 ms. If the concentration is lower than 1 mL/L, it is expected to approach from the curve of 1 mL/L to the curve of 0 mL/L. Thus, it is recognized that "≤35 mN/m" cannot be achieved.

D Then, each of Inventions 1, 7, 14, and 19 includes the matters specifying the Invention stated in the above A. Specifically, each of them contains as the matter specifying the Invention a surfactant in a concentration that makes the aqueous electrolyte composition have a dynamic surface tension of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer and comprised in a concentration range ≥ 0.0000001% by weight and ≤ 0.000002% by weight, but does not contain any perfluorinated compound.

E As stated in the above (1), therefore, it is unclear under what measurement conditions the "dynamic surface tension" of the Invention 1, 7, 14, and 19 is the value measured. As stated in the above C, when the concentration of surfactant is 2 mL/L or less (the body's note: it corresponds to approximately 0.2% by weight as the patentee states in Written Response 2 "the specific gravity of the aqueous solution and the specific gravity of the base electrolyte are approximately 1"), in spite of the dynamic surface tension being not ≤ 35 mN/m, as stated in the above D, each of Inventions 1, 7, 14, and 19 includes the matters of specifying the Invention in which the surfactant is comprised in a concentration of allowing the aqueous electrolyte composition to have a dynamic surface tension of the electrolyte composition of ≤ 35 mN/m measured by making use of a bubble pressure tensiometer, and the surfactant is comprised in a concentration range of ≥ 0.0000001% by weight and ≤ 0.000002% by weight. It cannot be said that the detailed description of the invention of the Specification describes how the addition of the surfactant in a range of slight concentration of ≥ 0.000001% by weight and ≤0.00002 % by weight makes the dynamic surface tension of the electrolyte composition a value of ≤ 35 mN/m.

F Furthermore, the same is also applied to Inventions 3 to 6, 8 to 10, 12, 13, and 15 to 18.

G Therefore, the descriptions in the detailed description of the invention of the Specification are not clearly and sufficiently described as to enable a person ordinarily skilled in the art to work Inventions 1, 3 to 7, 9, 10, and 12 to 19.

(3) Regarding Article 36(6)(i) of the Patent Act (requirements for support)

A A problem to be solved by the invention is "to provide an improved aqueous electrolyte composition for the deposition of a metal layer on a substrate surface reducing airborne emission." ([0014]).

B On the other hand, paragraphs [0019] to [0020] in the specification of the present application describe that, by reducing the dynamic surface tension of the electrolyte composition to a value 35 mN/m or below the gas bubbles created at the electrodes became very small; due to the reduction of the size of the gas bubbles the liquid wall of the bubbles becomes much thinner, which in turn leads to reduced forces when the bubbles disintegrate on the surface of the electrolyte composition; and this reduced force at the time of disintegration on one hand together with a reduced amount of liquid in the liquid wall of the bubbles on the other hand causes the beneficial effect of reduction or avoidance of airborne emission. From these described matters, it can be recognized that it is effective to reduce the dynamic surface tension of the aqueous electrolyte composition in order to solve the above problem. However, there is no numerical basis for the fact that the electrolyte composition has a dynamic surface tension of 35 mN/m or less.

C Of Examples 1 to 3 described in the Specification, only Examples 2 and 3 are explicitly described to be able to solve the above problem ([0038] to [0041]). Of Examples 1 to 3, Example 1 represents in FIG. 1 that the addition of 3 mL/L of methane disulfonic acid makes the aqueous electrolyte composition have a dynamic surface tension of ≤ 35 mN/m at a bubble lifetime exceeding 36000 ms and the addition of 4 mL/L of methane disulfonic acid makes the aqueous electrolyte composition have a dynamic surface tension of ≤ 35 mN/m at a bubble lifetime exceeding 13000 ms. However, Example 1 includes no description of reduced airborne emission. A reduction in airborne emission is described in both Examples 2 and 3. However, a surfactant represented by the general formula $C_NF_MH_ZSO_2X$ is not included in Example 2. In Example 3, on the other hand, a surfactant represented by the general formula $C_NF_MH_ZSO_2X$ is included but no description of the dynamic surface tension thereof is found. Therefore, it is not clear whether a reduced airborne emission can be attained when the surfactant represented by the general formula $C_NF_MH_ZSO_2X$ is comprised at a concentration of allowing the aqueous electrolyte composition to have a dynamic surface tension of ≤ 35 mN/m.

D In Examples 1 to 3, furthermore, the "surfactant" that satisfies the matter "a compound of the general formula $C_NF_MH_ZSO_2X$, wherein N is an integer ≥ 6 and ≤ 22, $M \leq 2N$, $Z = 2N + 1 - M$, and X is one of F, Cl, or Br" in Inventions 1, 14, and 19 or the matter "partially fluorinated but not perfluorinated" is only "3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride" in Example 3 (the body's note: it may be wrongly written instead of "3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctansulphonyl chloride") in Inventions 7 and 14.

E Furthermore, in Examples 1 to 3, there is no surfactant that satisfies the matter "the surfactant is comprised in a concentration range of ≥ 0.0000001% by weight and ≤ 0.000002% by weight in Examples" or the matter "the compound is present in a concentration ≥ 0.0000004% by weight and ≤ 0.0000015% by weight" in Invention 12.

F Here, regarding the matters stated in the above E, the Patentee states in Written Response 1 as follows: "As outlined in the specification of the present application, an aqueous electrolyte composition containing 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctansulphonyl chloride is added to the base electrolyte. Specifically, Example 3 describes the addition of a surfactant 'to the base electrolyte.' In this case, based on the disclosure, the addition of a surfactant should be recognized as one that means an aqueous solution containing a certain amount of surfactant. This is considered to be further proved by the fact that there is a description using 'mL/L'; for example,
'to a base electrolyte is added e.g., 0 mL/L, 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L.' In addition, the above aqueous solution contains about 0.0025% by weight of a commercially available anti-foaming agent, and this can be available as an aqueous solution containing 20% by weight of 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctansulphonyl chloride." (page 2, lines 12 to 27).

G Furthermore, the Patentee states in Written Response 2 that, in "this can be available as an aqueous solution containing 20% by weight of 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctansulphonyl chloride"; the word "this" means a commercially available "anti-forming agent"; i.e., CAPSTONEFS-65 (see 4-2 questionnaire (2)), and CAPSTONEFS-65 is an anti-foaming agent and also has the characteristics of a surfactant (see 4-2 questionnaire (1)).

H From the responses as stated in the above F and G, in Example 3, "an aqueous solution containing a certain amount of surfactant" is added to the base electrolyte. Here, "an aqueous solution containing a certain amount of surfactant" means one containing about 0.00025% by weight of "a commercially available anti-foaming agent"; i.e., "an aqueous solution containing 20% by weight of 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctansulphonyl chloride." In other words, in Example 3, "a commercially available anti-foaming agent," which is 20% by weight of an aqueous solution, is diluted to about 0.0025% by weight and then added to the base electrolyte.

I However, paragraph [0041] in the Specification, which is the description of Example 3, only describes that

"To a base electrolyte 3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride is added in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L, e.g., 1 mL/L, 2 mL/L, 3 mL/L, and 4 mL/L." From this description, it is recognized that "3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride" itself "in various concentrations up to about 4 mL/L, such as between 1 mL/L and 4 mL/L" was added. Even if what is added is not the "3,3,4,4,5,5,6,6,7,7,8,8-tridecafluorooctansulphonyl chloride" itself, but a 20% by weight aqueous solution, it cannot be read from the description of the present specification that the aqueous solution is not "a commercially available anti-foaming agent" and that "a commercially available anti-foaming agent" is diluted to <u>about 0.0025% by weight</u>, it cannot be recognized that a person skilled in the art could have a common recognition to dilute a commercially available aqueous solution to about 0.0025% by weight when a surfactant is added to a base electrolyte.

J Then, as stated in the above E, Examples 1 to 3 do not satisfy the matter that "the surfactant is comprised in a concentration range between ≥ 0.0000001% by weight and ≤ 0.000002% by weight" in Inventions 1, 7, 14, and 19, nor do they satisfy "the compound is present in a concentration ≥ 0.0000004% by weight and ≤ 0.0000015% by weight."

K Thus, it can be said that none of Examples 1 to 3 is included in Inventions 1, 7, 12, 14, and 19. Therefore, it can be said that none of Examples 1 to 3 shows that Inventions 1, 7, 12, 14, and 19 can solve the above problem.

L Furthermore, the same is also applied to Inventions 3 to 6, 8 to 10, 12, 13, and 15 to 18.

M Thus, each of Inventions 1, 3 to 7, 9, 10, and 12 to 19 is not disclosed in the Detailed Description of the Invention in the Specification and does not comply with the requirement under Article 36(6)(i) of the Patent Act.

N Therefore, the patent for Claims 1, 3 to 7, 9,10,12 to 19 has been granted on a patent application not complying with the requirements as provided in Article 36(6)(i) of the Patent Act.

5. Closing

As stated above and as considered in the above 4(1), the scope of claims for the inventions recited in Claims 1, 3 to 7, 9, 10, and 12 to 19 cannot be said to be clearly disclosed. Thus, these inventions do not comply with the requirements as provided in Article 36(6)(ii) of the Patent Act. Therefore, the patent for these claims falls under Article 113(4) of the Patent Act and should be revoked.

In addition, as considered in the above 4(2), the descriptions in the Detailed Description of the Invention are not clearly and sufficiently described as to enable a person ordinarily skilled in the art to work the inventions recited in Claims 1, 3 to 7, 9, 10, and 12 to 19 and thus do not comply with the requirements as provided in Article 36(4)(i) of the Patent Act. Therefore, the patent for these claims falls under Article 113(4) of the Patent Act and should be revoked.

Furthermore, as considered in the above 4(3), it cannot be said that the inventions recited in Claims 1, 3 to 7, 9, 10, and 12 to 19 are disclosed in the Detailed Description of the Invention. Thus, these inventions do not comply with the requirements as provided in Article 36(6)(i) of the Patent Act. Therefore, the patent for these claims falls under Article 113(4) of the Patent Act and should be revoked.

Moreover, the patent for Claims 2, 8, 11 has been deleted by the Correction. Therefore there is no applicable claim for the opposition to the grant of a patent made for Claims 2, 8, and 11 of the Patent by the Opponent.

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

January 15, 2020

Chief administrative judge: IKEFUCHI, Ryu
Administrative judge: TSUCHIYA, Tomohisa
Administrative judge: KAMEGAYA, Akihisa