Appeal decision

Appeal No. 2015-8925

USA
Appellant WATERS TECHNOLOGIES CORP

Tokyo, Japan
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The case of appeal against the examiner's decision of refusal of Japanese Patent Application No. 2013-111936, entitled "Porous inorganic/organic hybrid materials with ordered domains for chromatographic separations and processes for their preparation" (the application published on October 10, 2013, Japanese Unexamined Patent Application Publication No. 2013-210382, the number of claims (84)) has resulted in the following appeal decision:

Conclusion

The examiner's decision is revoked.

The invention of the present application shall be granted a patent.

Reason

No. 1 History of the procedures

The present application is a divisional application filed on May 28, 2013 from Patent Application No. 2007-523612 filed on July 15, 2005 as an international filing date (priority claim under the Paris Convention: July 30, 2004 (hereinafter referred to as the "priority date") US). The notice of reasons for refusal was issued on May 7, 2014, a written opinion and a written amendment were submitted on November 13, 2014, and the examiner's decision of refusal (hereinafter referred to as the "examiner's decision") was issued on January 5, 2015. Against this, an appeal against the examiner's decision of refusal was made on May 13, 2015, and a written amendment was submitted at the same time. Then, a notice of reasons for refusal (hereinafter referred to as the "notice of reasons for refusal by the body") was issued on January 5, 2016, and a written opinion, a written correction of mistranslation, and a written amendment were submitted on July 8, 2016.

No. 2 The Invention

The inventions relating to claims 1 to 84 of the present application are acknowledged as specified by the matters described in claims 1 to 84 of the scope of claims that were amended in the written amendment submitted on July 8, 2016. The invention relating to claim 1 (hereinafter referred to as the "Invention") that is an independent claim is as follows:

"[Claim 1]

1. A porous hybrid inorganic/organic particle or monolith comprising ordered domains and having a chromatographically-enhancing pore geometry, prepared in a method

comprising the steps of:
(a) preparing a pore restructuring template;
(b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and
(c) removing the pore restructuring template from the restructured pores;
wherein the porous hybrid inorganic/organic particle or monolith comprises inorganic-based structures wherein an organic functionality is integral to both the internal structure or skeletal inorganic structure and a hybrid particle or a monolith surface,
wherein the ordered domains are those found in porous inorganic/organic hybrid materials that exhibit diffraction peaks from 0.8 to 20° in scan range (x-axis, 2θ units) as measured by X-ray powder diffraction (XRPD),
wherein the pores of a diameter of 34 Å or less contribute less than 110 m^2/g to the specific surface area of the particle or monolith,
wherein the diffraction peak maxima observed for said particle or monolith exhibit a 2θ position that excludes diffraction peaks ranging from 20° to 23° resulting from atomic-range order that are associated with amorphous material, and
wherein the particle or monolith has a specific pore volume of 0.25 to 1.5 cm^3/g and an average pore diameter of 50 to 500 Å."

No. 3 Reasons for Refusal Stated in the Examiner's Decision
1 Outline of reasons for refusal stated in the examiner's decision

The Inventions of the subject application should not be granted a patent under the provision of Patent Law Section 29(2) since they could have easily been made by persons who have common knowledge in the technical field to which the invention(s) pertains, on the basis of the invention(s) described in the publication(s) listed below which were distributed or made available to the public through electric telecommunication lines in Japan or foreign countries prior to the filing of the subject application.

Publication 1:	WO2003/014450
Publication 2:	WO2003/022392
Publication 3:	JP2001-116737
Publication 4:	JP2000-17102
Publication 5:	JP2001-340755

In Publication 1 or Publication 2, there is no description about including the ordered domains that are those found in porous inorganic/organic hybrid materials that exhibit diffraction peaks from 0.8 to 20° in scan range (x-axis, 2θ units) as measured by X-ray powder diffraction (XRPD), which is described in the Invention. However, this invention falls within a scope that can be predicted by a person skilled in the art based on Publication 3 to Publication 5.

In addition, the inventions relating to claims 2 to 84 fall within a scope that can be predicted by a person skilled in the art based on the descriptions in Publication 1 or Publication 2 and the well-known arts.

2 Judgment of Reasons for Refusal Stated in the Examiner's Decision

(1) Described matters in Publication

A. WO2003/014450 that is a publication distributed before the priority date for the present application (hereinafter referred to as "Cited Document 1") describes the following matters. Note that the translation of the body is made with reference to the descriptions in National Publication of International Patent Application No. 2004-538468. Underlines are added to portions to which acknowledgement of the cited invention relates.

(1-A) "Summary of the Invention

The present invention relates to novel porous inorganic/organic hybrid materials and their use in chromatographic separations, processes for their preparation, and separations devices containing the chromatographic material. Thus, one aspect of the invention is a porous inorganic/organic hybrid material, comprising a chromatographically-enhancing pore geometry.

Another aspect of the invention is directed to a porous inorganic/organic hybrid material, wherein pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material.

Yet another aspect of the invention is a porous inorganic/organic hybrid monolith material, comprising a chromatographically-enhancing pore geometry.

Still another aspect of the invention is a porous inorganic/organic hybrid monolith material, wherein pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material.

Another aspect of the invention is a porous inorganic/organic hybrid monolith material, comprising coalesced porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry." (p. 5, ll. 15 to 32)

(1-B) ""Hybrid"; i.e., as in "porous inorganic/organic hybrid particles" or "porous inorganic/organic hybrid monolith" includes inorganic-based structures wherein an organic functionality is integral to both the internal or ‘skeletal’ inorganic structure as well as the hybrid material surface." (p. 15, ll. 13 to 16)

(1-C) "The present porous inorganic/organic hybrid materials having a chromatographically-enhancing pore geometry generally have a specific surface area, as measured by N_2 sorption analysis, of about 50 to 800 m^2/g, preferably about 75 to 600 m^2/g, more preferably about 100 to 350 m^2/g. The specific pore volume of the hybrid materials is generally about 0.25 to 1.5 cm^3/g, preferably about 0.4 to 1.2 cm^3/g, more preferably about 0.5 to 1.0 cm^3/g. The porous inorganic/organic hybrid materials having a chromatographically-enhancing pore geometry have an average pore diameter of generally about 50 to 500 Å, preferably about 60 to 500 Å, more preferably about 100 to 300 Å. The micropore surface area is less than about 110 m^2/g, preferably less than about 105 m^2/g, more preferably less than about 80 m^2/g, and still more preferably less than about 50 m^2/g.

Porous inorganic/organic hybrid materials having a chromatographically-enhancing pore geometry may be made as described below and in the specific instances illustrated in the Examples. Porous spherical particles of hybrid silica may, in one embodiment, be prepared by a multi-step process. In a first step, one

or more organoalkoxysilanes such as methyltriethoxysilane, and a tetraalkoxysilane such as tetraethoxy silane (TEOS) are prepolymerized to form a polyorganoalkoxysiloxane (POS), e.g., polyalkylalkoxysiloxane, by co-hydrolyzing a mixture of the two or more components in the presence of an acid catalyst. In a second step, the POS is suspended in an aqueous medium in the presence of a surfactant or a combination of surfactants and gelled into porous spherical particles of hybrid silica using a base catalyst. In a third step, the pore structure of the hybrid silica particles is modified by hydrothermal treatment, producing an intermediate hybrid silica product which may be used for particular purposes itself, or desirably may be further processed, as described below. The above three steps of the process allow much better control of the particle sphericity, morphology, pore volume, and pore sizes than those described in the prior art, and thus provide the chromatographically-enhancing pore geometry."
(p. 20, l. 22 to p. 21, l. 10)

The following inventions are acknowledged to be described in Cited Document 1 in the above-described organized described matters of Cited Document 1.

"A porous hybrid inorganic/organic hybrid monolith materials having a chromatographically-enhancing pore geometry, and
including inorganic-based structures wherein an organic functionality is integral to both the internal or ‘skeletal’ inorganic structure as well as the hybrid material surface,
wherein pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material,
wherein the monolith materials have a specific pore volume of about 0.25 to 1.5 cm^3/g, and an average pore diameter of about 50 to 500 Å." (hereinafter referred to as Cited Invention 1).

B. WO2003/022392 that is a publication distributed before the priority date for the present application (hereinafter referred to as "Cited Document 2") describes the following matters. Note that the translation of the body is made with reference to the descriptions in National Publication of International Patent Application No. 2005-502061. Underlines are added to portions to which acknowledgement of the cited invention relates.

(2-A) "Summary of the Invention

The present invention relates to a novel material for chromatographic separations, processes for its preparation, and separations devices containing the chromatographic material. In particular, one aspect of the invention is a porous inorganic/organic hybrid material, comprising porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry." (p. 3, ll. 15 to 20)

(2-B) "In another aspect, the invention is directed to a porous inorganic/organic hybrid material, comprising a chromatographically-enhancing pore geometry.

Yet another aspect of the invention is a porous inorganic/organic hybrid material, wherein pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material." (p. 8, ll. 25 to 29)

(2-C) ""Hybrid"; i.e., as in "porous inorganic/organic hybrid particles" includes inorganic-based structures wherein an organic functionality is integral to both the internal or 'skeletal' inorganic structure as well as the hybrid material surface." (p. 9, ll. 28 to 30)

(2-D) "The present porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry generally have a specific surface area, as measured by N_2 sorption analysis, of about 50 to 800 m^2/g, preferably about 75 to 600 m^2/g, more preferably about 100 to 350 m^2/g. The specific pore volume of the particles is generally about 0.25 to 1.5 cm^3/g, preferably about 0.4 to 1.2 cm^3/g, more preferably about 0.5 to 1.0 cm^3/g. The porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry have an average pore diameter of generally about 50 to 500 Å, preferably about 60 to 500 Å, more preferably about 100 to 300 Å. The micropore surface area is less than about 110 m^2/g, preferably less than about 105 m^2/g, more preferably less than about 80 m^2/g, and still more preferably less than about 50 m^2/g.

Porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry may be made as described below and in the specific instances illustrated in the Examples. Porous spherical particles of hybrid silica may, in a preferred embodiment, be prepared by a multi-step process. In a first step, one or more organoalkoxysilanes such as methyltriethoxysilane, and a tetraalkoxysilane such as tetraethoxysilane (TEOS) are prepolymerized to form a polyorganoalkoxysiloxane (POS), e.g., polyalkylalkoxysiloxane, by co-hydrolyzing a mixture of the two or more components in the presence of an acid catalyst. In a second step, the POS is suspended in an aqueous medium in the presence of a surfactant or a combination of surfactants and gelled into porous spherical particles of hybrid silica using a base catalyst. In a third step, the pore structure of the hybrid silica particles is modified by hydrothermal treatment, producing an intermediate hybrid silica product which may be used for particular purposes itself, or desirably may be further processed as described below. The above three steps of the process allow much better control of the particle sphericity, morphology, pore volume, and pore sizes than those described in the prior art, and thus provide the chromatographically-enhancing pore geometry." (p. 15, ll. 8 to 34)

The following inventions are acknowledged to be described in Cited Document 2 in the above-described organized described matters of Cited Document 2.

"A porous inorganic/organic hybrid material, comprising porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry,
wherein the "hybrid"; i.e., as in "porous inorganic/organic hybrid particles", includes inorganic-based structures wherein an organic functionality is integral to both the internal or 'skeletal' inorganic structure as well as the hybrid material surface,
wherein pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material,
wherein the hybrid materials have a specific pore volume of about 0.25 to 1.5 cm^3/g, and an average pore diameter of about 50 to 500 Å." (hereinafter referred to as Cited Invention 2).

C. JP2001-116737 that is a publication distributed before the priority date for the present application (hereinafter referred to as "Cited Document 3") describes the following matters.

(3-A) "[0017] An adsorption separation method of the invention using porous particles having fine pores as an adsorption separation material, the porous particles comprising a crystalline organic inorganic composite material having a skeleton comprising an organic group which has one or more carbon atoms, two or more metal atoms combined with the same or different carbon atoms in the organic group, and one or more oxygen atoms combined with the metal atoms."

(3-B) "[0092] (Example 1)
Synthesis of 1 and 2-bis (trimethoxysilyl) ethane ...
[0093] Synthesis of the porous particle precursor

0.432 g (1.35 mmol) of n-hexadecyl trimethylammonium chloride (surfactant), 30 g of ion exchange water, and a 1.5 g of 6-N NaOH aqueous solution (7.5 mmol of NaOH is contained) were introduced into a 100 mL beaker. While the mixture was stirred vigorously at room temperature, 2.03 g (7.5 mmol) of BTMe(s) were added thereto, and the mixture was stirred for 3 hours. After settling the mixture for 14 hours at a room temperature, the mixture was stirred for 12.5 hours, and stirred for 6.9 hours after further settled for 14 hours, and filtered. Precipitate was washed twice with 300 mL of ion exchange water, and 1.90 g of solid was obtained after air drying. This solid is a porous particle precursor and has the above-mentioned surfactant in fine pores.
[0094] Generation of porous particles

The surfactant was removed from the porous particle precursor by a method described below, and porous particles were obtained. That is, 1.0 g of the above-mentioned porous particle precursor was added to the mixture of 150-mL dehydrated ethanol and 3.8 g concentrated hydrochloric acid, and the mixture was stirred for 6 hours at 50 degrees C and filtered. The collected precipitate was processed with the mixture of dehydrated ethanol and concentrated hydrochloric acid once again under the same conditions. The precipitate obtained eventually was washed twice by 150-mL dehydrated ethanol, and porous particles were obtained by air-drying.

D. JP2000-17102 that is a publication distributed before the priority date for the present application (hereinafter referred to as "Cited Document 4") describes the following matters.

(4-A) "[Claim 1] (a) An organic/inorganic complex polymer porous material comprising (a) a polymer main chain comprising a metal atom, (b) an organic comprising 1 or two or more carbon atoms and combined with a metal atom that constitutes the main chain in the carbon atom, and (c) pores of which 60% or more of whole pore volume is contained in ±40% of range of pore diameters that show a maximum peak in the pore distribution curve."

(4-B) "[0036]

(Example 2) Synthesis of a meso-porous substance

(1)

Condensation polymerization of the MEMe was carried out to hydrolysis using NaOH as a catalyst under presence of a surfactant. To a 100-mL beaker, 1.152 g (3.6 mmol) of n-hexadecyl trimethylammonium chloride [$C_{16}H_{33}N$ (CH_3)3Cl], 30 g of ion exchange water, and 1.5 g of 6NNaOH aqueous solution (7.5 mmol of NaOH is contained) were put in. While the mixture was stirred vigorously at a room temperature, 2.03 g (7.5 mmol) of BEMe(s) was added thereto, followed by stirring for 3 hours. After settling the mixture for 14 hours at room temperature, the mixture was stirred for 12.5 hours, and stirred for 6.9 hours after being further settled for 14 hours, and filtered. Precipitate was washed twice with 300 mL of ion exchange water, and 1.90 g of solid output was obtained after air drying. Removal of the surfactant was performed by adding 1.0 g of the solid output to a mixture of 150-mL dehydrated ethanol and 3.8 g of concentrated hydrochloric acid, stirring at 50 degrees C for 6 hours, and filtering. The collected precipitate was subjected to the processing by HCl-EtOH once again under the same conditions. The precipitate was washed twice by 150-mL dehydrated ethanol, and a porous material was obtained by air-drying."

E. JP2001-340755 that is a publication distributed before the priority date for the present application (hereinafter referred to as "Cited Document 5") describes the following matters.

(5-A) "[0031] (Skeleton composition of a fine-pores wall) The porous body which has such a mesopore has a fine-pores wall of an inorganic system skeleton, or a fine-pores wall of inorganic matter/organic hybrid system skeleton. That is, the fine-pores wall in the porous body for gas adsorption separation of the present invention has an inorganic system skeleton, or an inorganic/organic hybrid system skeleton."

(5-B) "[0101] Example 1

With the use of a triblock copolymer denoted by the empirical formula of (EO) 17(PO) 58(EO) 17 as a non-ion system surfactant (hereinafter simply referred to as P104, manufactured by BASF make), tetraethyl silicate (TEOS) was used as a skeleton component. Under existence of P104, TEOS was hydrolyze using chloride as a catalyst, and condensation polymerization of the TEOS was carried out.

[0102] That is, 1.76 g (0.00035 mol) of P104 was dissolved in 105 ml of ion exchange water, and 20 ml (0.24 mol) of 12N chloride was added to this surfactant solution (6.67 mol of all the amount of water, surfactant concentration: 14.67 g/l). Then, 4.73 g of TEOS (0.021 mol) was added at once to thus-prepared compound liquid in a water bath at 45 degrees C. Then, the mixture was stirred for 8 hours, and settled in an 80 degrees C oil bath for 8 hours. After collecting the generated white precipitate by suction filtration and washing thoroughly with a lot of ion exchange water, the precipitate was left in a 45 degrees C oven overnight. Removal of the surfactant was carried out by raising the temperature from room temperature to 550 degrees C over 2 hours under air flow, and calcining the precipitate at 550 degrees C for 6 hours (flow rate 0.5 ml/min). As a result, the porous body (powder) of the sample 1 was obtained."

(2) Comparison

A Comparison between the Invention and Cited Invention 1
(A) "A porous inorganic/organic hybrid monolith materials having a chromatographically-enhancing pore geometry" described in Cited Invention 1 corresponds to "a porous hybrid inorganic/organic monolith having a chromatographically-enhancing pore geometry" in the Invention.

(B) "Inorganic-based structures wherein an organic functionality is integral to both the internal or ‘skeletal’ inorganic structure as well as the hybrid material surface" described in Cited Invention 1 corresponds to "inorganic-based structures wherein an organic functionality is integral to both the internal structure or skeletal inorganic structure and a hybrid monolith surface" in the Invention.

(C) "Pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material" described in Cited Invention 1 corresponds to "the pores of a diameter of 34 Å or less contribute less than about 110 m^2/g to the specific surface area of the monolith" in the Invention.

(D) "The specific pore volume is generally about 0.25 to 1.5 cm^3/g, and have an average pore diameter of generally about 50 to 500 Å" described in Cited Invention 1 corresponds to "has a specific pore volume of about 0.25 to 1.5 cm^3/g and an average pore diameter of about 50 to 500 Å" in the Invention.

In view of the above, the Invention and Cited Invention 1 are in correspondence in the following features:
(Corresponding features)
“A porous hybrid inorganic/organic monolith having a chromatographically-enhancing pore geometry,
wherein the porous hybrid inorganic/orgnic monolith comprises inorganic-based structures wherein an organic functionality is integral to both the internal structure or skeletal inorganic structure and a hybrid monolith surface,
wherein the pores of a diameter of 34 Å or less contribute less than 110 m^2/g to the specific surface area of the monolith, and
wherein the monolith has a specific pore volume of 0.25 to 1.5 cm^3/g and an average pore diameter of 50 to 500 Å.”, and
are different in the following features:

(The different feature 1)
The Invention is directed to a material “prepared in a method comprising the steps of: (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores” while Cited Invention 1 is not directed to a material prepared in the above-described manner.

(The different feature 2)

The Invention is directed to a material “comprising ordered domains”, “wherein the ordered domains are those found in porous inorganic/organic hybrid materials that exhibit diffraction peaks from 0.8 to 20° in scan range (x-axis, 2θ units) as measured by X-ray powder diffraction (XRPD)", and "wherein the diffraction peak maxima observed for said particle or monolith exhibit a 2θ position that excludes diffraction peaks ranging from 20° to 23° resulting from atomic-range order that are associated with amorphous material" while it is unclear whether Cited Invention 1 is directed to a material like the one in the Invention.

A Comparison between the Invention and Cited Invention 2
(A) "Porous inorganic/organic hybrid particles having a chromatographically-enhancing pore geometry" described in Cited Invention 2 corresponds to "a porous hybrid inorganic/organic particle having a chromatographically-enhancing pore geometry" in the Invention.

(B) "‘Hybrid’ i.e., ‘porous inorganic/organic hybrid particles’ includes inorganic-based structures wherein an organic functionality is integral to both the internal or ‘skeletal’ inorganic structure as well as the hybrid material surface" described in Cited Invention 2 corresponds to "inorganic-based structures wherein an organic functionality is integral to both the internal structure or skeletal inorganic structure and a hybrid particle surface" in the Invention.

(C) "Pores of a diameter of less than about 34 Å contribute less than about 110 m^2/g, preferably less than about 50 m^2/g to the specific surface area of the material" described in Cited Invention 2 corresponds to "the pores of a diameter of 34 Å or less contribute less than about 110 m^2/g to the specific surface area of the particle or monolith" in the Invention.

(D) "Have a specific pore volume of about 0.25 to 1.5 cm^3/g, and an average pore diameter of generally about 50 to 500 Å" described in Cited Invention 2 corresponds to "has a specific pore volume of 0.25 to 1.5 cm^3/g and an average pore diameter of 50 to 500 Å" in the Invention.

In view of the above, the Invention and Cited Invention 2 are in correspondence in the following features:
(Corresponding features)
"A porous hybrid inorganic/organic particle having a chromatographically-enhancing pore geometry,
wherein the porous hybrid inorganic/organic particle comprises inorganic-based structures wherein an organic functionality is integral to both the internal structure or skeletal inorganic structure and a hybrid particle surface,
wherein the pores of a diameter of 34 Å or less contribute less than 110 m^2/g to the specific surface area of the particle, and
wherein the particle has a specific pore volume of 0.25 to 1.5 cm^3/g and an average pore diameter of 50 to 500 Å.", and
are different in the following features:

(The different feature 1')

The Invention is directed to a material "prepared in a method comprising the steps of: (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores" while Cited Invention 2 is not directed to a material prepared in the above-described manner.

(The different feature 2')

The Invention is directed to a material "comprising ordered domains", "wherein the ordered domains are those found in porous inorganic/organic hybrid materials that exhibit diffraction peaks from 0.8 to 20° in scan range (x-axis, 2θ units) as measured by X-ray powder diffraction (XRPD)", and "wherein the diffraction peak maxima observed for said particle or monolith exhibit a 2θ position that excludes diffraction peaks ranging from 20° to 23° resulting from atomic-range order that are associated with amorphous material" while it is unclear whether Cited Invention 2 is directed to a material like the one in the Invention.

(3) Judgment of Different Features

A The different features 1 and 2 found in the comparison between the Invention and Cited Invention 1 are the same as the different features 1' and 2' found in the comparison between the Invention and Cited Invention 2, and accordingly the judgment of the different features 1 and 2 is the same as the judgment of the different features 1' and 2'.

B Examination on Different Feature 1

A porous inorganic/organic hybrid monolith material in Cited Invention 1 is the porous material that is obtained by the following method described in the Summary (1-C) of Cited Document 1: "In a first step, one or more organoalkoxysilanes such as methyltriethoxysilane, and a tetraalkoxysilane such as tetraethoxy silane (TEOS) are prepolymerized to form a polyorganoalkoxysiloxane (POS), e.g., polyalkylalkoxysiloxane, by co-hydrolyzing a mixture of the two or more components in the presence of an acid catalyst. In a second step, the POS is suspended in an aqueous medium in the presence of a surfactant or a combination of surfactants and gelled into porous spherical particles of hybrid silica using a base catalyst. In a third step, the pore structure of the hybrid silica particles is modified by hydrothermal treatment, producing an intermediate hybrid silica product which may be used for particular purposes itself, or desirably may be further processed, as described below. The above three steps of the process allow much better control of the particle sphericity, morphology, pore volume, and pore sizes than those described in the prior art, and thus provide the chromatographically-enhancing pore geometry."

A porous inorganic/organic hybrid material in Cited Invention 2 is the porous material that is obtained by the same method as the one in Cited Document 1 as described in the Summary (2-D) of Cited Document 2.

Meanwhile, a material in the Invention is obtained by a method of preparing a porous hybrid inorganic/organic particle or monolith, comprising the steps of: (a)

preparing a pore restructuring template;
(b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and
(c) removing the pore restructuring template from the restructured pores". To be specific, the method comprising the steps of "restructuring the pores of the porous hybrid inorganic/organic particle or monolith" by filling the already-obtained "pores" of the "inorganic/organic particle or monolith" "with the pore restructuring template", to thereby "restructure the pores into ordered domains", and "removing the pore restructuring template from the restructured pores".

There are descriptions about this feature in the specification of the Invention: "[0103] In one embodiment, the restructuring template is formed by using the templating molecule at a concentration above its critical micelle concentration (CMC), optionally in combination with a template swelling molecule. This results in the formation of micelles, vesicles, or networks of a variety of shapes, sizes, and orders, of the pore templating molecule, e.g., hexagonally close packed networks, as shown in FIG. 1."; and
"[0107] The pore templating molecule works its way into the pores of the hybrid material via a hybrid silicate dissolution/precipitation process as exemplified in FIG. 2. At this point in the process, the pores of the hybrid material are filled with the ordered pore-templating micelle bundles. The bundles restructure the pores into ordered domains.", and FIG. 1 and FIG. 2 are attached thereto.

界面活性剤	surfactant
ミセル	micelle
円筒形ミセルの束	cylindrical micelle bundle
多孔質ハイブリッド粒子	Porous Hybrid Particle
孔再構成テンプレート	Pore Restructuring Template
水	water
孔再構成テンプレートを有するハイブリッド粒子	Hybrid Particle with Pore Restructuring Template
テンプレートの除去	Remove Template
酸洗浄または熱処理	Acid Wash or Thermal Treatment
テンプレートが除去されたハイブリッド粒子	Hybrid Particle with Template removed

In view of the above, the porous hybrid inorganic/organic particle or monolith of the Invention can be made in the method consisting of the steps of further "filling the ‘pores’" of the porous inorganic/organic hybrid monolith material in Cited Invention 1 or the porous inorganic/organic hybrid material in Cited Invention 2 "with the pore restructuring template", "restructuring the pores of the porous hybrid inorganic/organic particle or monolith to thereby restructure the pores into ordered domains", and "removing the pore restructuring template from the restructured pores". It cannot be said that the "pores" of the Invention that have passed through these steps are the same as the "pores" of Cited Invention 1 and Cited Invention 2 before passing through these steps, because the "pores" of the Invention are restructured into ordered domains in conformity with the shape of the geometry of the "pore restructuring template".

In addition, in Cited documents 3 to 5, there is no description or indication about the matters specifying the Invention in terms of the above-described different feature 1, which are described in 1-C to 1-E of (1) Described matters in Publication.

In view of the above, applying the technical matters described in Cited Documents 3 to 5 to Cited Invention 1 or Cited Invention 2 cannot arrive at the matters specifying the Invention, which are described in the above-described different feature 1.

(4) Summary

Therefore, it cannot be said that the Invention could have been easily invented by a person skilled in the art based on Cited Invention 1 or Cited Invention 2, without having to examine the different feature 2 (i.e., the different feature 2').

In addition, since the invention relating to claim 2 of the present application includes the matters specifying the invention that are same as the matters specifying the Invention: "prepared in a method comprising the steps of (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores", it cannot be said, by the same judgment as for the Invention, that the invention relating to claim 2 of the present application could have been easily invented by a person skilled in the art.

In addition, because the inventions relating to claims 3 to 84 of the present application are those obtained by further limiting the Invention and the invention relating to claim 2 of the present application, it cannot be said that the inventions relating to claims 3 to 84 of the present application could have been easily invented by a person skilled in the art, similarly to the Invention or the invention relating to claim 2 of the present application.

Thus, the Invention cannot be rejected based on the reasons for refusal of the examiner's decision.

No. 4 Reasons for refusal by the body

1 Outline of Reasons for Refusal Stated in the Body

(1) In the present application, the description of the scope of claims for patent includes deficiency, and thereby does not comply with Article 36(6)(ii) of the Patent Act.

NOTE

The invention relating to claim 1 is directed to the invention of a product of a "particle or monolith".

However, including the description, "prepared in a method comprising the steps of (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by contacting the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores", corresponds to a case of including a description of a time-varying element in terms of production, or a case of including a description of a technical feature in terms of production, so that claim 1 is recognized to include a description relating to a method for producing the product.

Note that in a case where the scope of claims directed to the invention of a product includes a method for producing the product, it is reasonable to understand that the description in the scope of claims meets the "clarity requirements" stipulated in Article 36(6)(ii) of the Patent Act only when there exist circumstances such that it is impossible to directly specify the product by its structures or characteristics, or directly specifying the product by its structures or characteristics is impractical (hereinafter referred to as "impossible/impractical circumstances") at the time of filing of the application (on the retroactive date of the present application because the present application is a divisional application) (Judgment of the Supreme Court of Japan, 2nd Petty Bench, June 5, 2015, No. 1204, 2012, No. 2658, 2012).

However, there is no description about the impossible/impractical circumstances in the specification of the Invention, and it cannot be said that the impossible/impractical circumstances are obvious to a person skilled in the art.

Therefore, the invention relating to claim 1 and the inventions relating to claims 3 to 37 and claims 50 to 84 that are directly or indirectly dependent on claim 1 are not clear, and do not meet the requirements stipulated in Article 36(6)(ii) of the Patent Act.

(2) The inventions relating to claims 1 to 84 of the present application should not be granted a patent under the provision of Patent Law Section 29(2), since they could have easily been made by persons who have common knowledge in the technical field to which the invention(s) pertains, on the basis of the invention(s) described in the publication(s) listed below which were distributed or made available to the public through electric telecommunication lines in Japan or foreign countries prior to the filing of the subject application.

Publication 1:	WO2003/014450
Publication 2:	WO2003/022392
Publication 3:	JP2001-116737
Publication 4:	JP2000-17102
Publication 5:	JP2001-340755
Publication 6:	WO 2004/041398
Publication 7:	WO 2002/060562

Among them, Publications 1 to 5 are the same as Publications 1 to 5 cited in the notice of reasons for refusal stated in the examiner's decision as described in No. 3, 1. "Outline of Reasons for Refusal Stated in the Examiner's Decision". In the Notice of Reasons for refusal by the body, Publications 6 and 7 are further added thereto, and disclose the composition specified in the invention relating to claim 2 of the present application.

2 Judgment of Reasons for Refusal by the Body

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

In the written amendment submitted on July 8, 2016, the description of claim 1, "prepared in a method comprising the steps of (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by contacting the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores" was amended to "prepared in a method comprising the steps of (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores". (the underline is applied to the amended word.)

The demandant alleges as follows in the written opinion.

"However, in the Invention, there exist circumstances such that it is impossible to directly specify the product by its structures or characteristics, or directly specifying the product by its structures or characteristics is impractical ('impossible/impractical circumstances') at the time of filing of the application (on the retroactive date), and therefore the description in the scope of claims meets the "clarity requirements" stipulated in Article 36(6)(ii) of the Patent Act.

Because the Invention is directed to a porous hybrid inorganic/organic particle or monolith that is 'prepared in a method comprising the steps of (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores', the Invention can have a prominent effect to be able to provide a porous hybrid inorganic/organic particle or monolith comprising ordered domains and having a chromatographically-enhancing pore geometry (improved in chromatographic performance compared with the conventional art) (see the descriptions in paragraphs [0012], [0052], [0053], and [0107], and the descriptions in the Examples in the paragraphs from [0115]). In paragraph [0107], there is a description, 'The pore templating molecule works its way into the pores of the hybrid material via a hybrid silicate dissolution/precipitation process as exemplified in FIG. 2. At this point in the process, the pores of the hybrid material are filled with the ordered pore-templating micelle bundles. The bundles restructure the pores into ordered domains'. To be specific, in order to obtain a porous hybrid inorganic/organic particle or monolith comprising ordered domains and having a chromatographically-enhancing pore geometry, a porous hybrid inorganic/organic particle or monolith is prepared through the steps of (in a method) (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores' (see also FIG. 2). To be specific, the chromatographically-enhancing pore geometry of the porous hybrid inorganic/organic particle or monolith conforms to the pore restructuring template, and can only be specified as a geometry 'conformed to the pore restructuring template'. In addition, 'the pore restructuring template' that restrucures the pore geometry of the porous hybrid inorganic/organic particle or monolith is removed later (in the step of (c)), so that 'the pore restructuring template' no longer exists in the produced final porous hybrid inorganic/organic particle or monolith. Further, there are a great variety of pore geometries in terms of a geometry ‘conformed to the pore restructuring template’ described above. To specify the geometry to a specific geometry and/or to specify the geometry by specific structures or characteristics is impractical and almost impossible. Even if one pore geometry constituting the pore geometries is specified, the porous hybrid inorganic/organic particle or monolith includes a considerable number of pores, and the pore geometries are not the same. There is a description about ‘the pore restructuring template’ in paragraph [0022] in the specification of the Invention; ‘a ‘pore restructuring template’ is defined as an agent that acts to organize hybrid silicates to afford ordered domains within the hybrid material as the silicates dissolve and then precipitate during hydrothermal treatment. A pore restructuring template is comprised of one or inure pore templating molecules and, optionally one or more template swelling molecules. ...’, and further, there is a description, in paragraph [0023] in the specification of the Invention, ‘a ‘pore templating molecule’ is defined as a molecule which combines with other pore templating molecules to form micelles, vesicles, or networks of a variety of shapes, sizes, symmetries, and orders, e.g. cylindrical, spherical, hexagonal, cubic, triclinic, ... globule, worm-hole, inverted, or other higher order networks. One or a combination of two or more pore templating molecules can be used. ...’. As described above, a combination of two or more pore templating molecules can be used as ‘the pore restructuring template’, and ‘the pore restructuring template’ has a variety of pore geometries. Further, the formed pore geometry differs with methods for filling the pore templating molecules (see paragraphs [0106] and the like in the specification of the Invention). Therefore, the prepared pore geometries are of a variety of kinds, and the final porous hybrid inorganic/organic particle or monolith accordingly becomes of a variety of kinds. Thus, in order to specify the entire porous hybrid inorganic/organic particle or monolith, it is necessary to specify each of the pore geometries (of a variety of kinds) of a combination of two or more pore templating molecules; however, such work requires enormous time and cost, which is not practical at all and is almost impossible.

Therefore, in the Invention, there exist circumstances such that it is impossible to directly specify the product by its structures or characteristics, or such that directly specifying the product by its structures or characteristics is impractical (‘impossible/impractical circumstances’) at the time of filing of the application (on the retroactive date), and therefore, we consider it becomes apparent that the description in the scope of claims meets the ‘clarity requirements’ stipulated in Article 36(6)(ii) of the Patent Act."

As the result of examination, since the Invention is directed to "a porous hybrid inorganic/organic particle or monolith" "prepared in a method comprising the steps of: (a) preparing a pore restructuring template; (b) restructuring the pores of the porous hybrid inorganic/organic particle or monolith by filling the pores of the inorganic/organic particle or monolith with the pore restructuring template, to thereby restructure the pores into ordered domains; and (c) removing the pore restructuring template from the restructured pores", "the pore restructuring template" no longer exists in the prepared "porous hybrid inorganic/organic particle or monolith", and it is understood from the specification of the Invention that the state of the pores of "the porous hybrid inorganic/organic particle or monolith" that defines the final prepared product differs with the type, the shape, or the filling status of "the pore restructuring template" with which the pores are filled in the middle of the preparation.

It is impossible to directly specify the state of "the pores" by their structures or characteristics that differ with the type, the shape, or the filling status of "the pore restructuring template" that does not exist in the final prepared product. Thus, it can be said that there exist the "impossible/impractical circumstances" that are held by the Supreme court decision, June 5, 2015, No. 1204 and No. 2658, so that the description in the scope of claims relating to claim 1 meets the "clarity requirements" stipulated in Article 36(6)(ii) of the Patent Act.

Therefore, the above-described item (1) of the notice of reasons for refusal by the body is resolved

(2) Article 29 (2) of the Patent Act

Since Publications 6 and 7 that are added in the notice of reasons for refusal by the body are cited in order to indicate that the composition specified in the invention relating to claim 2 of the present application had been already well-known prior to the priority date of the present application, there is no change in the judgment to the effect that the different feature 1 (i.e., the different feature 1') described in (3) Judgment of Different Features of No. 3. 2 "Judgment of reasons for refusal stated in the examiner's decision" does not fall within a scope that can be predicted by a person skilled in the art based on the descriptions in Publications 6 and 7.

Therefore, as described in No. 3. 2 "Judgment of Reasons for Refusal Stated in the Examiner's Decision", it cannot be said that the Invention and the invention relating to claim 2 fall within a scope that can be predicted by a person skilled in the art. In addition, it cannot be said that the inventions relating to claims 3 to 84 of the present application obtained by further limiting the Invention and the invention relating to claim 2 of the present application fall within a scope that can be predicted by a person skilled in the art.

Therefore, the present application cannot be rejected by the above-described item (2) of the above-described reasons for refusal by the body.

No. 5 Closing

As described above, the Invention cannot be rejected by the reasons for refusal stated in the examiner's decision and the reasons for refusal by the body.

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

August 24, 2016

Chief administrative judge: KORIYAMA, Jun
Administrative judge: MISAKI, Hitoshi
Administrative judge: WATADO, Masayoshi