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Datasheet for the decision of 30 June 2017

Case Number: T 1292/15 - 3.3.05

Application Number: 04012767.2

Publication Number: 1481955

IPC: C04B41/50, C04B20/10, C04B35/628, C04B30/02

Language of the proceedings: EN

Title of invention:
Porous body-coated fiber, porous body-coated particle, and formed article using the same

Applicant:
NICHIAS CORPORATION
Naito, Makio

Headword:
Porous body-coated fiber/Nichias

Relevant legal provisions:
EPC Art. 84, 123(2)

Keyword:
Clarity - Main request, first to fifth and seventh auxiliary requests (no)
Amendment - sixth auxiliary request - allowable (no)

Decisions cited:

Catchword:

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Case Number: T 1292/15 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 30 June 2017

Appellant: (Applicant 1)	NICHIAS CORPORATION 1-26, Shiba Daimon 1-chome Minato-ku Tokyo (JP)
Appellant: (Applicant 2)	Naito, Makio 3-707, Hozumidai Ibaraki-shi, Osaka 567-0044 (JP)
Representative:	Grünecker Patent- und Rechtsanwälte PartG mbB Leopoldstraße 4 80802 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 12 December 2014 refusing European patent application No. 04012767.2 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	E. Bendl
Members:	G. Glod
	P. Guntz

Summary of Facts and Submissions

I. The present appeal lies from the decision of the examining division to refuse European patent application 04012767.2 for lack of clarity.

II. With the statement of grounds of appeal, the applicant (appellant) submitted a main and six auxiliary requests and filed the following documents:

- Additional Document 1 relating to silica aerogel
- Additional Document 2: Basic characteristics of AEROSIL® fumed silica from Evonik industries
- Additional Experimental Data
- Enclosure E including Photos A and B

III. In a communication under Rule 100(2) EPC, the board indicated in its preliminary opinion that none of these requests seemed allowable.

IV. By letter of 21 December 2016, the appellant submitted a new main request and seven auxiliary requests.

Claim 1 of the **main request** is as follows:

"*1. A porous body-coated fiber comprising:*
an inorganic fiber; and
a porous body comprising fine inorganic particles associated with one another in ring-shaped or helical manner to form secondary particles, wherein said inorganic fiber is coated with said porous body."

Claim 1 of the **first auxiliary request** is as follows:

"*1. A porous body-coated fiber comprising:*
inorganic fibers; and

a porous body comprising fine inorganic particles associated with one another in ring-shaped or helical manner to form secondary particles, wherein said porous body coats the surface of individual inorganic fibers completely."

Claim 1 of the **second auxiliary request** is identical to claim 1 of the first auxiliary request except that "*A porous body-coated fiber*" has been replaced by "*A heat insulating material*".

Claim 1 of the **third auxiliary request** is identical to claim 1 of the second auxiliary request except that "*the heat insulating material having a thermal conductivity at 25°C temperature of 0.04 W/(m*k) or less*" has been added at the end.

Claim 1 of the **fourth auxiliary request** is identical to claim 1 of the first auxiliary request except that ", *and said fine inorganic particles being fine silica particles*" has been included after "*secondary particles*".

Claim 1 of the **fifth auxiliary request** is identical to claim 1 of the first auxiliary request except that ", *and said fine inorganic particles being ultrafine granular anhydrous silica or supercritical dry silica*" has been included after "*secondary particles*".

Claim 1 of the **sixth auxiliary request** is as follows:

"*1. A porous body-coated fiber comprising:*
inorganic fibers; and
a porous body comprising fine inorganic particles associated with one another to form secondary particles, and said fine inorganic particles being

ultrafine granular anhydrous silica or supercritical dry silica, wherein said porous body coats the surface of individual inorganic fibers completely."

Claim 1 of the **seventh auxiliary request** is identical to claim 1 of the main request except that "*an inorganic fiber*" has been replaced by "*inorganic fibers*" and ", said fine inorganic particles having an average primary particle size of 5 to 50 nm" has been added after "*secondary particles*".

V. Oral proceedings took place on 30 June 2017.

VI. The arguments of the appellant that are relevant to the present decision may be summarised as follows:

It was correct that the ring shape or helical shape could not be seen in Figure 5(C) of the application in suit, but when observing the particles on the surface of this figure and of Figure 6 at a higher magnification, the ring shape or helical shape could be seen.

Photo A of Enclosure E clearly showed secondary particles that could be considered to have a ring-like form.

Additional Document 2 described a method where primary particles could be associated in ring-shaped or helical manner. A ring-shaped or helical structure could be produced by a production method described in Additional Document 2 on page 11, in which a gas is subjected to flame hydrolysis, or by performing supercritical drying.

The schematic representation in Photo A of one of the ring-shaped agglomerates clearly proved that even from a two-dimensional picture information could be gathered with respect to the three-dimensional stacking of the respective primary particles. Furthermore, in the present application it was clearly disclosed that, at least preferably, the inner diameter of the ring-shaped associates was in the range of from 100 nm or less. In addition, the present application provided several examples and comparative examples allowing the average skilled person to clearly understand what was meant by ring-shaped or helical agglomerates.

VII. The appellant requests that the examining division's decision be set aside and that a patent be granted on the basis of the set of claims of the main request, or alternatively on the basis of one of the set of claims of the first to seventh auxiliary requests, all requests submitted with the letter of 21 December 2016.

Reasons for the Decision

Main request

1. Article 84 EPC

1.1 The requirements of Article 84 EPC are not fulfilled for the following reasons:

1.1.1 According to the definition given in claim 1, the inorganic particles have to be associated with one another **"in ring-shaped or helical manner to form secondary particles"**. This means that, in order to establish the scope of the claim, the skilled person must be able to understand the meaning of the terms

"ring-shaped" and "helical" in the claimed context and must be in a position to determine whether the (primary) inorganic particles are associated in a ring-shaped or helical manner and whether they form secondary particles at all.

In other words, the applicant, who chooses to define the scope of the claim by unusual properties, has to ensure that a skilled person can easily and unambiguously verify whether he is working inside or outside the scope of the claim.

1.1.2 The application itself is silent about exactly what is to be understood by "ring-shaped or helical secondary particles", how a "ring-shaped or helical" association can be determined and how it can be concluded that secondary particles are formed. Figure 5(C) of the application in suit allegedly shows an electron photomicrograph of an inorganic fibre coated by a porous body, but it is impossible to recognise secondary particles and/or primary particles associated in a ring-shaped or helical manner in said figure. This was confirmed by the appellant, but he has not provided any magnification of the figure that would allow a ring-shaped or helical form to be clearly distinguished from other structures present, and the board cannot recognise how such a distinction could be made.

1.1.3 The applicant submitted a **photo A** on 14 October 2014 (resubmitted as enclosure E with the statement setting out the grounds of appeal of 22 April 2015), allegedly representing an embodiment of the invention, without providing any indication how the picture and the particles shown therein were obtained. To the board the picture shows an agglomeration of particles having some voids inbetween. The board cannot recognise why the

skilled person would call such an agglomeration ring-like or helical rather than dendrite-like or spherical. The appellant has also not provided any arguments in that respect that would make it possible to understand which requirements have to be met for an agglomeration to be "ring-like" or "helical" and how a distinction between "ring-like" or "helical" and "dendrite-like" or "spherical" could be made.

1.1.4 In addition, the manner in which secondary particles should be delimited in said photograph is rather arbitrary, since there is no standard method and/or software that would do this in a reproducible manner. **Photo B** submitted on the same date as photo A is supposed to show alumina sol particles not having such secondary particles, i.e. allegedly not falling within the scope of claim 1 of the request at issue. Although no details are given as to how photo B was obtained, it is evident that all pictures have a different resolution than photo A, which makes a direct comparison with that photograph impossible. Even observing the picture of alumina sol-550 at the highest resolution, the board still cannot identify any clear difference to what is shown in photo A.

1.1.5 With the statement setting out the grounds of appeal of 22 April 2015, the appellant submitted **Additional Document 1** in support of his arguments. For the board it is unclear how the skilled person is able to extract schematic diagram 5 of that document from SEM photograph 2 and to conclude that the agglomerates shown in said photograph are inorganic particles associated with one another in ring-shaped or helical manner. The applicant has also not provided any evidence in that respect as to how this could be done

by routinely analysing the photographs, e.g. by means of well-established software.

1.1.6 **Additional Document 2** does not contain any reference to ring-shaped or helical secondary particles, let alone any way of determining such structures. Said document refers to agglomerates (page 20), spherical particles (page 22), irregular chains (page 23), network structure (page 24), "snowballs" (page 25) and secondary particle size (aggregates) (page 26). There is also no indication in said document or evidence in the form of examples that would allow the skilled person to conclude that the process described in chapter 2.1 of said document leads to ring-shaped or helical secondary particles or to distinguish the latter from the cited spherical particles or irregular chains.

As a consequence the document does not provide the skilled person with any information that would help him to understand the meaning of "ring-shaped or helical secondary particles".

1.1.7 The appellant also argued that the examples present in the application allowed the skilled person to clearly understand the meaning of ring-shaped or helical agglomerates. However, it is only mentioned that, prior to press-forming, the treated fibres were taken out and observed under an electron microscope. The surface of the ceramic fibre was found to be completely covered with a porous body comprising the fine silica particles, as shown in Figure 5(C) of the application (page 24, lines 4 to 8). It is incomprehensible to the board how details about the exact structure of the particles can be seen from Figure 5(C) and why such an association would be ring-shaped or helical rather than

dendritic or spherical. The appellant provided no magnification of said figure and no explanation how the skilled person would be able to recognise the desired particles from the figures.

1.1.8 The **Additional Experimental Data** annexed to the statement setting out the grounds of appeal of 22 April 2015 also does not help in clarifying the expression under debate. In the additional example according to the present invention it is indicated that secondary particles are ring-shaped/helical. Agglomerates of secondary particles adhered to each other without forming any space therebetween are present in the comparative example. A reason for this difference is not given in the Annex, but is apparently based on the different production methods (that are not provided in the Annex), as explained in the appellant's statement of grounds of appeal (page 4). Details of the production process for the secondary particles formed of a plurality of fine inorganic particles associated with one another in ring-shaped or helical manner are also completely missing in the application (page 10, lines 4 to 7). Therefore, it cannot be accepted that the skilled person would inevitably obtain the porous body as claimed, comprising fine inorganic particles associated with one another in ring-shaped or helical manner in the form of secondary particles, when following the production step of the application. The appellant relies on Additional Document 2, but has not provided process details for either example 1 or comparative example 2. Therefore, these examples too do not allow us to understand the exact meaning of "in ring-shaped or helical manner to form secondary particles".

1.1.9 The appellant also alleges that the thermal conductivity could be taken as an indirect measure for the presence or absence of ring-shaped or helical agglomerates. However, the application does not contain such a correlation, and so the skilled person does not know which thermal conductivity values are supposed to represent ring-shaped or helical agglomerates as compared to agglomerates of secondary particles adhered to each other without forming any space therebetween. Thus this property can likewise not be used to distinguish the claimed fibres from other porous products.

1.1.10 To summarise, the meaning of the terms "ring-shaped or helical" is unclear in the context of the claims at issue, and the documents and arguments presented in order to show the contrary are not convincing. Thus the board cannot recognise how the skilled person can determine without doubt whether he is working inside or outside claim 1.

1.1.11 Therefore, the requirements of Article 84 EPC are not considered to be met.

First to fifth and seventh auxiliary requests

2. Article 84 EPC

Claim 1 of all these requests also includes the expression "in ring-shaped or helical manner to form secondary particles". The amendments with respect to claim 1 of the main request included in claim 1 of these requests do not help to clarify any of the points raised for the main request, since they do not specify how it can be determined that particles are associated in ring-shaped or helical manner. Therefore the

arguments given in point 1.1 above still apply to these requests.

As a consequence, none of the first to fifth and seventh auxiliary requests fulfils the requirements of Article 84 EPC.

Sixth auxiliary request

3. Article 123(2) EPC

In claim 1 of auxiliary request 6 the expression "in ring-shaped or helical manner" has been deleted. This amendment is not directly and unambiguously derivable from the original application for the following reasons:

The original application discloses the fine inorganic particles associated with one another in ring-shaped or helical manner as an essential characteristic of the invention (see page 10, lines 5 to 7, lines 22 to 24, page 17, lines 6 to 8). Porous bodies with other associations of these inorganic particles that completely coat the individual inorganic fibres are not disclosed as forming part of the claimed invention. There is also no indication in the application that ultrafine granular anhydrous silica or supercritical dry silica inevitably associate in ring-shaped or helical manner to form secondary particles. Rather to the contrary, comparative example 1A and comparative example 2A show that large particles formed by aggregation of the fine silica particles are possible. This is also in line with the Additional Experimental Data, since in the comparative example the fine silica particles agglomerate to secondary particles adhered to each other without forming any space therebetween.

However, after omission of the terms "in ring-shaped or helical manner", the wording of the claim also encompasses further (undefined) secondary structures such as the coated fibres of the comparative examples, which were originally not part of the claimed invention. This amendment goes beyond the original disclosure.

Therefore, claim 1 of the sixth auxiliary request does not fulfil the requirements of Article 123(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated