

Internal distribution code:

- (A) Publication in OJ
(B) To Chairmen and Members
(C) To Chairmen
(D) No distribution

**Datasheet for the decision
of 13 September 2012**

Case Number: T 2246/09 - 3.3.07

Application Number: 05709923.6

Publication Number: 1713584

IPC: B01J 35/04, F01N 3/28

Language of the proceedings: EN

Title of invention:

Honeycomb structure, honeycomb structure assembly, and
honeycomb catalist

Applicant:

Ibiden Co., Ltd.

Headword:

-

Relevant legal provisions:

EPC Art. 84, 123(2)

Keyword:

"Claims - clarity (no) - main and first to third auxiliary
requests"

"Amendments - added subject-matter (yes) - fourth to seventh
auxiliary requests"

Decisions cited:

-

Catchword:

-



Case Number: T 2246/09 - 3.3.07

D E C I S I O N
of the Technical Board of Appeal 3.3.07
of 13 September 2012

Appellant: Ibiden Co., Ltd.
(Applicant) 2-1, Kandacho
Ogaki-Shi, Gifu 5030917 (JP)

Representative: Grünecker, Kinkeldey
Stockmair & Schwanhäusser
Leopoldstraße 4
D-80802 München (DE)

Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 6 July 2009
refusing European patent application
No. 05709923.6 pursuant to Article 97(2) EPC.

Composition of the Board:

Chairman: J. Riolo
Members: D. Semino
M.-B. Tardo-Dino

Summary of Facts and Submissions

- I. The appeal lies from the decision of the examining division announced at the oral proceedings on 10 June 2009 refusing European patent application No. 05 709 923.6.
- II. The decision was based on three sets of amended claims filed as main request, first auxiliary request and second auxiliary request with letter of 28 April 2009.
- III. According to the decision the subject-matter of the independent claims according to all requests did not meet the requirements of Article 56 EPC.
- IV. The applicant (appellant) filed a notice of appeal against the above decision. With the statement setting out the grounds of appeal, the appellant submitted a single set of claims as main request. Claim 1 according to the main request read as follows:

"1. A honeycomb structure assembly, comprising:
at least two honeycomb structures each having multiple through holes and including ceramic particles, an inorganic reinforcing agent selected from inorganic fibers and whiskers, and an inorganic binder,
wherein the wall thickness of each wall between adjoining through holes is not greater than 0.25 mm,
and the relation of $Y \geq 2250 \times X + 22,500$ is satisfied wherein $50 \leq X \leq 80$ and $35,000 \leq Y \leq 70,000$, where X, expressed in percent (%), denotes the aperture ratio of a honeycombed face of said honeycomb structure perpendicular to the multiple through holes, and Y, expressed in square meter per liter (m^2/L) denotes the

specific surface area per unit volume of said honeycomb structure; and
at least one seal layer that joins adjacent honeycomb structures with each other via respective closed outer faces of said honeycomb structures that are different from respective honeycombed faces of said honeycomb structures perpendicular to the multiple through holes, wherein the honeycomb structure has a cross section area perpendicular to the through holes in the range of from 5 to 50 cm²,
wherein the amount of inorganic fibers or whiskers included in the honeycomb structure is from 3 to 50% by weight."

V. In a communication sent in preparation to oral proceedings the Board addressed *inter alia* the lack of clarity of claim 1 of the main request related to the presence of the parameter Y ("specific surface area per unit volume of said honeycomb structure") which was not fully defined in the claim and whose definition given in the description was contradictory and related to a formula with no clear physical meaning.

VI. With letter of 7 August 2012 sent in response to that communication the appellant filed seven sets of claims as first to seventh auxiliary requests.

Claim 1 of the first auxiliary request corresponded to claim 1 of the main request with the addition that the wall thickness "is not less than 0.1 mm". Claim 1 of the second auxiliary request corresponded to claim 1 of the main request with the addition that "the inorganic fibers included in the honeycomb structure are one or multiple types selected among alumina fibers, silica

fibers, silicon carbide fibers, silica alumina fibers, glass fibers, and potassium titanate fibers". Claim 1 of the third auxiliary request included the amendments according to claim 1 of both the first and the second auxiliary request. Claim 1 of fourth to seventh auxiliary requests corresponded to claim 1 of the main and first to third auxiliary requests respectively with the further addition that "the specific surface area per unit volume of said honeycomb structure is determined by the following formula
$$Y \text{ (m}^2\text{/L)} = X \text{ (\% by volume)} / 100 \times B \text{ (m}^2\text{/g)} \times C \text{ (g/L)}$$
wherein X is determined by BET determination according to JIS-R-1626(1996) and wherein C is the apparent density of the honeycomb structure".

VII. Oral proceedings were held on 13 September 2012.

VIII. As far as relevant to the present decision the appellant argued essentially that it was readily apparent from the description, especially from the disclosure on pages 20 and 21, how to determine the parameter Y, namely by calculating the product of A (ratio of the volume of the material of honeycomb structure to the total volume of the whole honeycomb structure, i.e. the apparent volume), B (the BET specific surface area per unit weight of the honeycomb structure measured according to Japanese standard JIS-A-1626 (1996)) and C (the apparent density, i.e. the ratio of the weight and the apparent volume of the honeycomb structure). Therefore the parameter Y as used in claim 1 of the main request and of the first to third auxiliary requests did not result in lack of clarity. In addition the fourth to seventh auxiliary requests included explicitly the formula for

calculating Y as taken from pages 20 and 21 of the description.

- IX. The appellant requested that the decision under appeal be set aside and that a patent be granted on the basis of the main request submitted with the statement of grounds, or, alternatively, on the basis of one of the seven auxiliary requests filed with the letter dated 7 August 2012.

Reasons for the Decision

1. The appeal is admissible.

Main Request

2. Claim 1 of the main requests includes the parameter Y, which is indicated to be the specific surface area per unit volume of the honeycomb structure, expressed in square meter per liter, and specifies two conditions which the parameter Y should meet, namely that the relation " $Y \geq 2250 \times X + 22,500$ " is satisfied and that Y belongs to the range 35000 to 70000. In order for the claim to be clear it is therefore necessary that the skilled person understands what is meant by the parameter Y so that he is able to check whether the conditions are met.
- 2.1 At least two options are perfectly reasonable for the skilled person trying to give a meaning to the wording "specific surface area per unit volume of said honeycomb structure". These options depend on whether by volume of the honeycomb structure one intends the

total volume of the whole structure (i.e. including the through holes), which is referred to as "apparent volume" in the application (indicated as V_{app} in what follows), or the volume of the material of the structure excluding the volume of the through holes, which one may call "effective volume" (indicated as V_{eff} in what follows).

2.2 Since the volume of the through holes is 50 to 80% of the total volume (as indicated by the parameter X, which is the ratio of the total sum of the areas of the through holes to the honeycomb cross section, see page 12, lines 9 to 13 of the original application and the condition in claim 1 of the main request), the two volumes V_{app} and V_{eff} may differ by a factor of 2 to 5, so that the lack of an indication of which of the two is meant does not make it possible to verify whether the conditions on the parameter Y are met and therefore to check whether one is operating within the limits of the claim or outside of it.

2.3 Since claims must be clear in themselves when being read with normal skills, but not including any knowledge derived from the description (as established by the case law, see Case Law of the Boards of Appeal, 6th edition 2010, II.B.1.1.2), the lack of an indication of what is meant by the parameter Y in claim 1 results in the claim not to be clear. The conditions of Article 84 EPC are therefore not met.

2.4 It is further pointed out that, under the present circumstances, the clarity deficiency could not be remedied by simply taking a definition of the parameter Y from the description and introducing the

specification of which of the two volumes is meant, since the information available in the description in this respect is contradictory and does not shed light on what is actually meant.

2.5 The paragraph bridging pages 20 and 21, which is the only one cited by the appellant in this context, gives a definition in words, namely that "the specific surface area per unit volume of the honeycomb structure represents the specific surface area per apparent volume of the honeycomb structure" (page 21, lines 7 to 10), and adds a mathematic formula to calculate that parameter, namely:

$$S \text{ (m}^2\text{/L)} = A \text{ (\% by volume)} / 100 \times B \text{ (m}^2\text{/g)} \times C \text{ (g/l)}$$

(page 21, line 12).

2.5.1 According to the mathematical formula and the explanation in the paragraph bridging pages 20 and 21 one should compute A as the ratio of the volume of the material of the honeycomb structure except the volume of the through holes to the total volume of the whole honeycomb structure (in mathematical terms $A = V_{\text{eff}}/V_{\text{app}}$), B as the BET specific surface area per unit weight of the honeycomb structure measured according to Japanese standard JIS-A-1626 (1996) (in mathematic terms $B = S_a/W$, where S_a is the surface area and W is the weight of the sample piece used for the measurement) and C as the apparent density, i.e. the ratio of the weight and the apparent volume of the honeycomb structure (in mathematical terms $C = W/V_{\text{app}}$) and then obtain the specific surface area by multiplying A, B and C, which would result in the following:

$$A \times B \times C = V_{\text{eff}}/V_{\text{app}} \times S_a/W \times W/V_{\text{app}} = V_{\text{eff}} \times S_a / (V_{\text{app}})^2.$$

2.5.2 According to the definition in words the parameter Y should be instead the ratio of the surface area to the apparent volume, which in mathematical term would mean: $Y = S_a/V_{app}$. By simple analysis of the defined parameters one can see that in order to obtain the ratio indicated in words (specific surface area per apparent volume) it would be sufficient to multiply B and C, namely:
 $B \times C = S_a/W \times W/V_{app} = S_a/V_{app}$.

2.6 The result of the mathematic formula is therefore not only in contradiction with the only sentence defining in words what is meant by specific surface area per unit volume, but has no understandable physical meaning, introduces the possibility of the relevance of the effective volume and raises the questions whether an error took place and which of the definitions is the one which is actually meant and used in the application.

2.7 The appellant did not provide any explanation which could resolve the lack of understanding of the critical passage and no other information is available in the application which could definitely explain what is meant by specific surface area per unit volume. In this respect it is worthwhile mentioning that the introductory part of the examples simply repeats the not understandable formula on page 21 (paragraph bridging pages 25 and 26) and values of Y are given for the examples, but without any information on the values of A, B and C (Figure 6).

2.8 These considerations explain why the Board considers that the clarity deficiency could not simply be remedied by taking the definition of the parameter Y from the description and introducing it into the claim.

First to third auxiliary requests

3. None of the amendments in claim 1 according to the first to third auxiliary requests (introduction of the lower limit for the wall thickness, specification of the types of inorganic fibers or both) addresses the issue of lack of clarity found for claim 1 of the main request. In view of this claim 1 according to the first, second and third auxiliary requests does not meet the requirements of Article 84 EPC, because it is not clear for the same reasons as detailed for the main request (point 2, above).

Fourth to seventh auxiliary requests

4. In the fourth to seventh auxiliary request the specific surface area per unit volume of the honeycomb structure is defined as being "determined by the following formula
- $$Y \text{ (m}^2\text{/L)} = X \text{ (\% by volume)} / 100 \times B \text{ (m}^2\text{/g)} \times C \text{ (g/L)}$$
- wherein X is determined by BET determination according to JIS-R-1626(1996) and wherein C is the apparent density of the honeycomb structure". As basis for the amendment the formula on page 21, line 12 of the original application is given (see point 2.5, above).

- 4.1 A direct comparison of the formula on page 21, line 12 of the original application and the one added to claim 1 according to the fourth to seventh auxiliary requests shows that they differ in at least two respects, namely in that the parameter X is inserted in place of the parameter A, the two parameters having quite different physical meaning (X being the ratio of

the total sum of the areas of the through holes to the honeycomb cross section, see page 12, lines 9 to 13 of the description, and A being the ratio of the volume of the material of the honeycomb structure except the volume of the through holes to the total volume of the whole honeycomb structure, see page 20, lines 18 to 23 of the description) and in that X is said to be determined by BET determination according to JIS-R-1626(1996), whereas this method is mentioned for the determination of B in the original application (page 20, line 23 - page 21, line 1).

- 4.2 In view of these differences the cited passage cannot provide a basis for the amendment.
- 4.3 Since the formula inserted in claim 1 of the fourth, fifth, sixth and seventh auxiliary request has no basis in the original application, these claims do not meet the requirements of Article 123(2) EPC.
5. Since all the requests on file fall under Article 84 or Article 123(2) EPC, there is no reason for the Board to decide on any other issue.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar

The Chairman

L. Fernández Gómez

J. Riolo