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Datasheet for the decision of 19 July 2018

Case Number: T 0515/13 - 3.3.05

Application Number: 08712357.6

Publication Number: 2122714

IPC: H01M2/14, H01M2/16

Language of the proceedings: EN

Title of invention:
ORGANIC/INORGANIC COMPOSITE SEPARATOR HAVING POROUS ACTIVE COATING LAYER AND ELECTROCHEMICAL DEVICE CONTAINING THE SAME

Applicant:
LG Chem, Ltd.
Toray Industries, Inc.

Headword:
Organic/inorganic composite separator/LG and Toray

Relevant legal provisions:
EPC Art. 123(2), 14(2), 84, 83, 111(1)

Keyword:
Amendments - allowable (yes)
Claims - clarity (yes)
Sufficiency of disclosure - (yes)

Decisions cited:
T 0700/05

Catchword:

Europäisches Patentamt
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Beschwerdekammern

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Case Number: T 0515/13 - 3.3.05

D E C I S I O N
of Technical Board of Appeal 3.3.05
of 19 July 2018

Appellant: (Applicant 1)	LG Chem, Ltd. 20, Yoido-dong Youngdungpo-gu, Seoul 150-721 (KR)
Appellant: (Applicant 2)	Toray Industries, Inc. 2-1-1, Nihonbashimuromachi Chuo-ku Tokyo (JP)
Representative:	Goddar, Heinz J. Boehmert & Boehmert Anwaltspartnerschaft mbB Pettenkoferstrasse 22 80336 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 12 October 2012 refusing European patent application No. 08712357.6 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 the then pending requests of European patent application EP 08 712 357.6 for not fulfilling the requirements of Articles 83 and 84 EPC.

II. With its statement of grounds of appeal the appellant (applicant) submitted an amended main request and an amended auxiliary request.

III. In a communication under Rule 100(2) EPC dated 18 May 2017, the board was of the opinion that the requirements of Article 83 EPC did not appear to be met.

IV. By letter of 18 October 2017 the appellant filed a new main request and auxiliary requests 1 to 7.

V. In a communication pursuant to Article 15(1) RPBA dated 27 February 2018, the board was of the opinion that none of the requests appeared to be admissible, as they were *prima facie* not allowable.

VI. By letter of 16 July 2018 the appellant submitted a new main request and auxiliary requests 1 to 5.

VII. An affidavit from a sworn translator was submitted on 17 July 2018.

VIII. Oral proceedings took place on 19 July 2018, at which the appellant presented an affidavit from Mr Jeon and made the fifth auxiliary request its sole request.

Claim 1 of this request is as follows:

"*1. An organic/inorganic composite separator, comprising,*
(a) a polyethylene porous substrate having a porosity of 45% and a thickness of 16 µm; and
(b) a porous active layer containing a mixture of Al_2O_3 particles having a diameter of 400 nm and a density of 4.123 g/cm^3 and a binder polymer being a mixture, in identical parts by weight, of polyvinylidenefluoride-co-hexafluoropropylene having a contact angle to a water drop of 100° and cyanoethylpolyvinylalcohol having a contact angle to a water drop of 30°, wherein a weight ratio of the binder polymer/Al_2O_3 is 10/90, with which the polyethylene porous substrate is coated, wherein the porous active layer has a peeling force of 27.44 N/m (28 gf/cm), and a thermal shrinkage of the separator after being left alone at 150°C for 1 hour is 20% in a machine direction (MD) or in a transverse direction (TD), wherein the coating thickness of the porous active layer is 4 µm on one surface of the polyethylene porous substrate, wherein a pore size in the porous active layer is 0.5 µm and a porosity is 58%, the weight of the porous active layer is 16 g/m^2 per unit area, and the number of Al_2O_3 particles in the porous active layer is 5 x 10^{19} /m^2,
wherein, after a sample film was made using a corresponding binder polymer, a distilled water drop is fallen thereon, the contact angle to a water drop is measured using a contact angle measurer model CA-DT-A under the condition of 23°C and 50% RH, wherein the contact angles are measured at left and right points of each of three sample films, and six measured values are averaged and set as a contact angle, wherein the distilled water drop has a diameter of 2 mm,
and the contact angle value displayed on the measurer shows a contact angle measured 1 minute after the distilled water drop is fallen,

wherein the peeling force is measured by firmly attaching the organic/inorganic composite separator to a glass plate using a transparent double-sided tape, the separator having a width of 1.5 cm and a length of 6 to 8 cm, and measuring a force required for separating the porous active layer from the polyethylene porous substrate using a tensile force measuring device."

Claim 2 differs from claim 1 in that part (b) is as follows:

"*(b) a porous active layer containing a mixture of Al_2O_3 particles having a diameter of 400 nm and a density of 4.123 g/cm^3 and a binder polymer being a mixture, in identical parts by weight, of polyvinylidenefluoride-co-trichloroethylene having a contact angle to a water drop of 95° and cyanoethylpolyvinylalcohol having a contact angle to a water drop of 30°, wherein a weight ratio of the binder polymer/Al_2O_3 is 10/90, with which the polyethylene porous substrate is coated, wherein the porous active layer has a peeling force of 30.38 N/m (31 gf/cm), and a thermal shrinkage of the separator after being left alone at 150°C for 1 hour is 20% in a machine direction (MD) or in a transverse direction (TD), wherein a pore size in the porous active layer is 0.5 µm and a porosity is 58%, the weight of the porous active layer is 16 g/m^2 per unit area, and the number of Al_2O_3 particles in the porous active layer is 5 x 10^{19}/m^2, wherein, after a sample film was made ...*"

Claim 3 differs from claim 1 in that part (b) is as follows:

"*(b) a porous active layer containing a mixture of $BaTiO_3$ particles having a diameter of 400 nm and having a density of 5.7 g/cm^3 and binder polymer being a mixture, in identical parts by weight, of polyvinylidenefluoride-co-hexafluoropropylene having a contact angle to a water drop of 100° and cyanoethylpolyvinylalcohol having a contact angle to a water drop of 30°, wherein a weight ratio of the binder polymer/$BaTiO_3$ is 10/90, with which the polyethylene porous substrate is coated, wherein the porous active layer has a peeling force of 24.5 N/m (25 gf/cm), and a thermal shrinkage of the separator after being left alone at 150°C for 1 hour is 20% in a machine direction (MD) or in a transverse direction (TD), wherein a pore size in the porous active layer is 0.5 µm and a porosity is 58%, and wherein the weight of the porous active layer is 22 g/m^2 , and the number of $BaTiO_3$ particles is 4 x 10^{19} /m^2,*
wherein, after a sample film was made ...".

Claim 4 is as follows:

"*4. An electrochemical device including a cathode, an anode, a separator and a [sic] electrolyte, wherein the separator is the organic/inorganic composite separator defined in any one of claims 1 to 3.*"

Claim 5 is a preferred embodiment of claim 4.

IX. The appellant requests that the examining division's decision be set aside and that a patent be granted on the basis of the sole request, submitted as fifth auxiliary request with the letter of 16 July 2018.

Reasons for the Decision

1. Article 123(2) EPC

Claims 1 to 3 correctly and completely reflect examples 1 to 3 of the application as filed.

Further, the method for determining the contact angle is based on paragraph [23] of the application as filed. In said paragraph the English text has been brought into conformity with the original Korean text in accordance with Article 14(2) EPC (see also T 700/05, Reasons 4.1.1).

The following passage of said paragraph [23]:

"*In the present invention, after a sample film was made using a corresponding binder polymer, a distilled water drop was fallen thereon, and then a contact angle formed on the water drop was set as 23 degrees. Also, the contact angle to a water drop was measured using a contact angle measurer model CA-DT-A (mfd. produced by Kyowa Kaimen Kagaku KK) under the condition of 50% RH.*"

is now replaced by:

"*In the present invention, after a sample film was made using a corresponding binder polymer, a distilled water drop was fallen thereon, and then a contact angle formed on the water drop was measured using a contact angle measurer model CA-DT-A (mfd. produced by Kyowa Kaimen Kagaku KK) under the conditions of 23°C and 50% RH.*"

Based on the evidence presented on 17 July 2018 and Mr Jeon's affidavit, it is accepted that the new

translation is the correct one. Further, this new text also makes more technical sense than the previous one.

The method for determining the peeling force is based on paragraph [74].

Claims 4 and 5 correspond to claims 20 and 21 of the application as filed.

Therefore, the subject-matter of claims 1 to 5 is directly and unambiguously derivable from the application as filed, and the requirements of Article 123(2) EPC are met.

2. Article 84 EPC

The requirements of Article 84 EPC are met for the following reasons:

Claims 1 to 3 are formulated as three independent claims. This is accepted, since the subject-matter of claims 1 to 3 is considered to involve alternative solutions within the meaning of Rule 43(2)(c) EPC.

The examining division's objections with respect to Article 84 (see reasons 1.3 and 2.3 of the impugned decision) are overcome, since claim 1 now clearly defines the composition of the organic/inorganic composite separator and includes the methods for determining the contact angle and the peeling force, respectively.

3. Article 83 EPC

Claims 1 to 3 have been restricted to examples 1 to 3 of the patent application. There is no doubt that these

examples can be reworked by the skilled person, so the examining division's findings establishing an undue burden for the skilled person (see reasons 1.2 and 2.2 of the impugned decision) no longer apply.

The requirements of Article 83 EPC are met.

4. Article 111(1) EPC

The impugned decision dealt only with Articles 123(2), 84 and 83 EPC. Since the reasoning given in the contested decision no longer applies to the present request, and since the appellant has requested that the case be remitted to the examining division, the board exercises its discretion under Article 111(1) EPC in favour of this remittal.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the examining division for further prosecution on the basis of the sole request, submitted as fifth auxiliary request with the letter dated 16 July 2018.

The Registrar: The Chairman:

C. Vodz E. Bendl

Decision electronically authenticated