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Datasheet for the decision of 28 November 2017

Case Number: T 0330/14 - 3.3.09

Application Number: 05725616.6

Publication Number: 1726051

IPC: H01L51/30

Language of the proceedings: EN

Title of invention:
ELECTRICALLY CONDUCTING ORGANIC POLYMER/NANOPARTICLE COMPOSITES AND METHODS FOR USE THEREOF

Patent Proprietor:
E. I. du Pont de Nemours and Company

Opponent:
Heraeus Deutschland GmbH & Co. KG

Headword:

Relevant legal provisions:
EPC Art. 123(2)

Keyword:
Amendments - added subject-matter (yes) all requests

Decisions cited:
G 0003/89, G 0011/91, G 0001/03, G 0002/10

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

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Case Number: T 0330/14 - 3.3.09

D E C I S I O N
of Technical Board of Appeal 3.3.09
of 28 November 2017

Appellant: (Patent Proprietor)	E. I. du Pont de Nemours and Company Chestnut Run Plaza 974 Center Road P.O. Box 2915 Wilmington, DE 19805 (US)
Representative:	Towler, Philip Dean Dehns St Bride's House 10 Salisbury Square London EC4Y 8JD (GB)
Respondent: (Opponent)	Heraeus Deutschland GmbH & Co. KG Heraeusstr. 12-14 63450 Hanau (DE)
Representative:	Herzog, Fiesser & Partner Patentanwälte PartG mbB Immermannstrasse 40 40210 Düsseldorf (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 6 January 2014 revoking European patent No. 1726051 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman W. Sieber
Members: N. Perakis
E. Kossonakou

Summary of Facts and Submissions

I. This decision concerns the appeal filed by the patent proprietor against the decision of the opposition division revoking European patent No. 1 726 051.

II. With the notice of opposition the opponent requested that the patent be revoked in its entirety on the grounds of Article 100(a) (lack of novelty and lack of inventive step), (b) and (c) EPC.

The relevant documents cited in the opposition proceedings were:

E2 : WO 2005/090436 A1;

E10: US 10/804503 (priority document of the patent in suit, filed on 19.03.2004) and

E11: US 10/803114 (priority document of E2, filed on 17.03.2004).

III. The opposition division held that the subject-matter of claim 1 of the main request and the eleven auxiliary requests complied with Articles 123(2), 83 and 84 EPC.

Regarding Article 123(2) EPC, the opposition division found that the subject-matter of claim 1 of the main request and of all auxiliary requests was directly and unambiguously derivable from the application as filed, considered as a whole. Since the application as filed was identical to the priority document E10, the claimed subject-matter was directly and unambiguously derivable from E10 as well.

However, the opposition division decided that the priority claim was not valid for at least claim 1 of all requests, because E10 was not the first filing for the claimed subject-matter. This had already been disclosed in E11, which had been filed by the proprietor of the patent in suit two days earlier than E10. Therefore, the effective date of the claimed subject-matter of all requests was the filing date of the patent in suit, namely 16 March 2005.

In view of the finding on priority, E2, which correctly claimed the priority of E11, became a document to be considered under Article 54(3) EPC. Since the content of E2 was identical to its priority document E11, the subject-matter of claim 1 of the main request and the eleven auxiliary requests lacked novelty over E2.

IV. The patent proprietor (in the following the appellant) appealed the decision of the opposition division. With the statement setting out the grounds of appeal dated 2 May 2014 it filed sets of claims corresponding to a main and eight auxiliary requests.

The claims of the main request are identical to the claims of the main request considered by the opposition division. Claim 1 reads as follows:

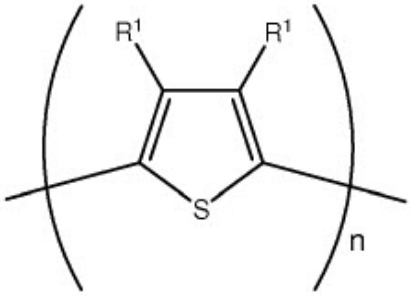
"1. A method of forming a buffer layer in an electronic device, said method comprising

adding a plurality of nanoparticles to an aqueous dispersion of an electrically conductive organic polymer selected from the group consisting of polythiophenes of Formula III, polypyrroles of Formula IV, and combinations thereof, doped with a polymeric acid,

adjusting the pH to a more basic level; and

depositing a buffer layer from the aqueous dispersion onto a substrate;

wherein Formula III is:

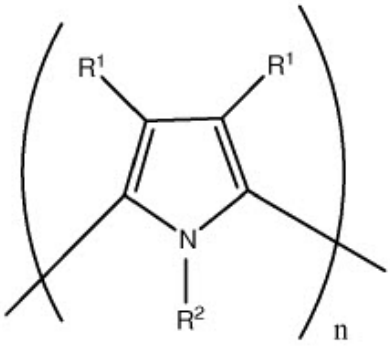


(III)

wherein:
R^1 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and urethane; or both R^1 groups together may form an alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, or sulfur atoms, and n is at least 4; or
both R^1 together form -O-(CHY)m-O-, where m is 2 or 3, and Y is the same or different at each occurrence and is selected from hydrogen, alkyl, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and

urethane, wherein at least one Y group is a substituent having F substitute for at least one hydrogen;

and Formula IV is:



(IV)

wherein:
n is at least about 4:
R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and
R^2 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl,

carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane,

characterised in that said nanoparticles are colloid-forming fluorinated polymeric sulfonic acid particles."

Claim 1 of auxiliary request 1 corresponds to claim 1 of the main request, amended to specify that the polymeric acid is selected from poly(styrenesulfonic acid), or poly(2-acrylamido-2-methyl-1-propanesulfonic acid), and mixtures thereof.

Claim 1 of auxiliary request 2 corresponds to claim 1 of the main request, with the definition of the polymer of formula III modified to remove the possibility that both R^1 together form a -O-(CHY)m-O- bridge.

Claim 1 of auxiliary request 3 corresponds to claim 1 of auxiliary request 1, with the definition of the polymer of formula III modified to remove the possibility that both R^1 together form a -O-(CHY)m-O- bridge.

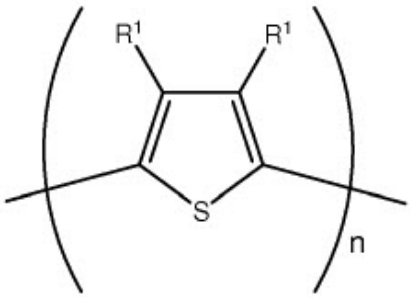
Claim 1 of auxiliary request 4 corresponds to claim 1 of the main request, except that the electrically conductive organic polymer can no longer be a polythiophene of formula III.

Claim 1 of auxiliary request 5 corresponds to claim 1 of auxiliary request 1, except that the electrically conductive organic polymer can no longer be a polythiophene of formula III.

Claim 1 of auxiliary request 6 reads as follows:

"1. The use of a composition comprising an aqueous dispersion of an electrically conductive organic polymer selected from the group consisting of polythiophenes of Formula III, polypyrroles of Formula IV, and combinations thereof, doped with a polymeric acid and a plurality of nanoparticles to improve the device efficiency and stress life of an electroluminescence device comprising a buffer layer deposited from said composition;

wherein Formula III is:

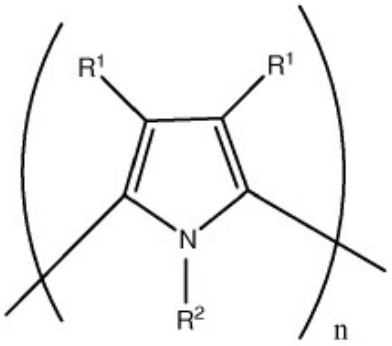


(III)

wherein:
R^1 is independently selected so as to be the same or different at each occurrence and is selected from alkyl, alkenyl, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and urethane; or both R^1 groups together may form an alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, or sulfur atoms, and n is at least 4; or

both R^1 together form -O-(CHY)m-O-, where m is 2 or 3, and Y is the same or different at each occurrence and is selected from hydrogen, alkyl, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and urethane, wherein at least one Y group is a substituent having F substitute for at least one hydrogen;

and Formula IV is:



(IV)

wherein:
n is at least about 4:
R^1 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, alkoxy, alkanoyl, alkythio, aryloxy, alkylthioalkyl, alkylaryl, arylalkyl, amino, alkylamino, dialkylamino, aryl, alkylsulfinyl, alkoxyalkyl, alkylsulfonyl, arylthio, arylsulfinyl, alkoxycarbonyl, arylsulfonyl, acrylic acid, phosphoric acid, phosphonic acid, halogen, nitro, cyano, hydroxyl, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, sulfonate, and urethane; or both R^1 groups together may form an alkylene or alkenylene chain completing a 3, 4, 5, 6, or 7-membered aromatic or alicyclic ring, which ring may optionally include one or more divalent nitrogen, sulfur or oxygen atoms; and

R^2 is independently selected so as to be the same or different at each occurrence and is selected from hydrogen, alkyl, alkenyl, aryl, alkanoyl, alkylthioalkyl, alkylaryl, arylalkyl, amino, epoxy, silane, siloxane, alcohol, amidosulfonate, benzyl, carboxylate, ether, ether carboxylate, ether sulfonate, sulfonate, and urethane,

characterised in that said nanoparticles are colloid-forming fluorinated polymeric sulfonic acid particles."

Claim 1 of auxiliary request 7 corresponds to claim 1 of auxiliary request 6, with the definition of the polymer of formula III modified to remove the possibility that both R^1 together form a -O-(CHY)m-O- bridge.

Claim 1 of auxiliary request 8 corresponds to claim 1 of auxiliary request 6, except that the electrically conductive organic polymer can no longer be a polythiophene of formula III.

V. The opponent (in the following the respondent) filed observations on the appeal on 10 November 2014.

VI. On 22 September 2017, the board issued a communication in preparation for the scheduled oral proceedings. Regarding the issue of added subject-matter, the board expressed its preliminary opinion that none of the appellant's requests appeared to comply with the requirements of Article 123(2) EPC.

VII. With letter of 23 October 2017, the appellant withdrew its request for oral proceedings and requested that they be cancelled, with the appeal proceedings being continued in writing. It informed the board that if the

oral proceedings were not cancelled, it would not be attending them.

VIII. On 28 November 2017 oral proceedings took place before the board. The appellant, as announced, was not represented.

IX. The arguments put forward by the appellant in its written submissions and relevant to the present decision may be summarised as follows:

- The opposition division had been correct in finding that claim 1 of the main request fulfilled the requirements of Articles 123(2) and 84 EPC.

- However, it had erred in taking the view that E11, and not E10, corresponded to the patentee's first filing of the subject-matter of claim 1 of the main request, and that this subject-matter lacked novelty over E2, which claimed the priority of E11.

- Contrary to the opposition division's decision, the combination of features in claim 1 of the main request was not directly and unambiguously derivable from E11, because the skilled person had to make multiple selections in order to arrive at it. Consequently, E10 was the first filing, so the priority claim was valid and E2 was not prior art under Article 54 EPC.

- The subject-matter of claim 1 of all auxiliary requests complied with Articles 123(2) and 54 EPC.

X. The arguments put forward by the respondent in its written submissions and during the oral proceedings and

relevant to the present decision may be summarised as follows:

- The subject-matter of claim 1 of the main request was unclear, contained added subject-matter and lacked novelty in view of E2, which enjoyed the priority of E11.

- The appellant had not applied the same standard for assessing novelty and added subject-matter, but the same standard applied in both cases.

- Applying the same standard, the subject-matter of claim 1 of the main request was either directly and unambiguously derivable from the application as filed and E11 (confirming the opposition division's decision), or it was not derivable from them, with the consequence that claim 1 of the main request did not fulfil the requirements of Article 123(2) EPC. In the respondent's view, the latter was correct.

- The objection of added subject-matter also applied to claim 1 of auxiliary requests 1 to 5.

- The subject-matter of claim 1 of auxiliary requests 6-8 relating to "the use of a composition" on the one hand lacked clarity because the feature "to improve the device efficiency and stress life of an electroluminescent device" did not have a clear meaning, and on the other hand contained added subject-matter for the reasons provided in the context of claim 1 of the main request.

XI. The appellant requested that the decision under appeal be set aside and that the case be remitted to the

opposition division for consideration of the remaining issues in relation to the main request or, alternatively, to any of auxiliary requests 1 to 8, all requests filed with the statement setting out the grounds of appeal dated 2 May 2014.

XII. The respondent requested that the appeal be dismissed, or that the case be remitted to the opposition division for assessment of inventive step if any of the appellant's requests were found to fulfil the requirements of Articles 84, 123(2) and 54 EPC.

Reasons for the Decision

1. In the statement setting out the grounds of appeal, the appellant argued that the method defined in claim 1 of the main request had been disclosed for the first time in E10 (the priority document of the patent in suit) and not in E11 (the priority document of E2). Therefore, the subject-matter of the claims of the main request could validly claim priority from E10, with the result that the relevant date for assessing novelty was 19 March 2004. Under those circumstances, E2 was not state of the art under Article 54 EPC.

More precisely, the appellant held that the skilled person would have to make selections from three lists in E11 in order to arrive at the method of claim 1 of the main request: firstly, he would have to select colloid-forming polymeric acid particles to be added to the mixture; secondly, he would have to select the colloid-forming fluorinated polymeric sulfonic acid particles; and thirdly he would have to choose to add

such acids after polymerisation. Such a triple selection was not directly and unambiguously derivable from the disclosure of E11.

Of course, the appellant agreed with the reasoning of the opposition division that the claims of the main request fulfilled the requirements of Article 123(2) EPC.

2. The board agrees with the respondent that the appellant does not seem to have applied the same standard to the questions

- whether the subject-matter of claim 1 of the main request is disclosed in the application as filed and thus complies with Article 123(2) EPC, and

- whether it is disclosed in E11, with the consequence that E11 - not E10 - is the first filing, by virtue of Article 87(1) EPC.

The appellant appears to use a "less strict" approach when answering the first question above, but a "more strict" one when it comes to what is disclosed in E11.

3. The board cannot accept this divergent approach to added matter and novelty.

The case law of the boards of appeal of the EPO has established a "gold standard" for assessing compliance with Article 123(2) EPC. According to this standard, any amendment to the parts of a European patent application or of a European patent relating to the disclosure is subject to the mandatory prohibition on extension laid down in Article 123(2) EPC and therefore - irrespective of the amendment's context - can only be

made within the limits of what a skilled person would derive directly and unambiguously, using common general knowledge, and seen objectively and relative to the date of filing, from the whole of these documents as filed (G 3/89, OJ 1993, 117; G 11/91, OJ 1993, 125; G 2/10, OJ 2012, 376).

At the same time the Enlarged Board has stressed the importance of applying this "gold standard" as a uniform concept of disclosure with reference to Articles 54, 87 and 123 EPC (G 2/10 OJ 2012,376, point 4.6 of the reasons, citing G 1/03, OJ 2004, 413, point 2.2.2 of the reasons).

4. The board has some sympathy with the appellant's argument that a skilled person would not directly and unambiguously derive the subject-matter of claim 1 of the main request from E11. However, applying the gold standard to the disclosure of the application as filed the board comes to the conclusion that, as explained below, the subject-matter of claim 1 of the main request does not comply with Article 123(2) EPC.

4.1 The said subject-matter concerns:

(a) a method of forming a buffer layer in an electronic device, said method comprising

(b) adding a plurality of nanoparticles to an aqueous dispersion of an electrically conductive organic polymer,

(c) adjusting the pH to a more basic level, and

(d) depositing a buffer layer from the aqueous dispersion onto a substrate,

(e) whereby the nanoparticles are colloid-forming fluorinated polymeric sulfonic acid particles,

(f) the electrically conductive organic polymer is selected from the group consisting of polythiophenes of Formula III, polypyrroles of Formula IV, and combinations thereof, and

(g) the electrically conductive organic polymer is doped with a polymeric acid.

4.2 The passage on page 5, lines 27-31, of the application as filed is taken as the basis for assessing the issue of amendments under Article 123(2) EPC, because it relates to a method for producing buffer layers which comprises the step of adding a plurality of nanoparticles to an aqueous dispersion of an already prepared electrically conductive organic polymer. This passage also discloses the step of depositing a buffer layer from said aqueous dispersion onto a substrate. These buffer layers are prepared with a view to their use in electronic devices (page 2, lines 22-24 and 26-29; page 3, lines 33-37). This passage thus discloses features (a), (b) and (d) in combination.

4.3 Feature (c) is disclosed as an optional step given the terminology used, namely "in accordance with another embodiment" (page 5, lines 14-17), and in view of various passages of the application as filed such as:

- page 17, lines 28-29, which discloses that "it is frequently desirable to have aqueous dispersions of conductive polymers with a higher pH";

- page 18, lines 1-4, which discloses that "adjusting the pH to higher, more neutral values, does not deleteriously affect the electrical properties and device performance of the conductive polymers ... and in most cases improves those properties";

- page 19, lines 2-4, which discloses that "In other cases the pH can be further reduced with acidic ion-exchange resins for the applications where high acidity is not an issue"; and

- examples 1-7 which do not involve pH adjustment.

On the basis of the above, feature (c) corresponds to a first selection from the disclosure of the application as filed.

4.4 The chemical nature of the nanoparticles, feature (e), is disclosed in the application as filed as being one among many alternatives (page 14, lines 14-15). Thus this feature corresponds to a second selection.

4.5 The chemical nature of the electrically conductive organic polymer, feature (f), derives from the list disclosed on page 6, lines 16-18 of the application as filed, namely polyanilines, polythiophenes, polypyrroles and combinations thereof, i.e. seven alternatives in total. Restriction to three of these alternatives corresponds to a third selection.

4.6 Lastly, the specific dopant to be added, feature (g), is selected from the water-soluble acids disclosed on page 11, lines 11-15 of the application as filed. This corresponds to a fourth selection.

4.7 In the absence of any pointer in the application as filed towards combining the features selected above,the subject-matter of claim 1 of the main request does not fulfil the requirements of Article 123(2) EPC. It may be added in this context that not a single example of the application as filed has the combination of features required by claim 1 of the main request.

5. Nor does claim 1 of any of auxiliary requests 1-5 overcome this objection, because the skilled person still has to select features (c), (e), (f) and (g) from the disclosure of the application as filed.

6. Regarding claim 1 of auxiliary requests 6-8, which is a "use" claim, the objections regarding the chemical nature of the nanoparticles (feature (e)), the chemical nature of the electrically conductive organic polymer (feature (f)), and the specific dopant (feature (g)) also apply. Therefore, the subject-matter of claim 1 of auxiliary requests 6-8 likewise does not fulfil the requirements of Article 123(2) EPC.

7. In view of the above, none of the appellant's requests complies with Article 123(2) EPC.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

M. Cañueto Carbajo W. Sieber

Decision electronically authenticated