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D E C I S I O N
of 11 September 2003

Case Number: T 0619/00 - 3.4.2

Application Number: 92914965.6

Publication Number: 0593612

IPC: H01M 2/16

Language of the proceedings: EN

Title of invention:
Polymeric sheet

Patentee:
Scimat Limited

Opponent:
Hollingsworth & Vose Company
JAPAN VILENE COMPANY, LTD.

Headword:
-

Relevant legal provisions:
EPC Art. 52(1), 54, 56, 84, 100(a), 100(b), 113(1), 114(1), 123(2)
EPC R. 57a
RPBA Art. 11(3)

Keyword:
"Main request - added subject-matter (yes)"
"First auxiliary request - admissibility of new dependent claims (no)"
"Second auxiliary request - added subject-matter (no) - sufficiency of disclosure (yes) - novelty and inventive step (yes)"

Decisions cited:
T 0256/87, T 0492/92, T 0225/93, T 0378/97, T 0960/98, T 0930/99

Catchword:
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Case Number: T 0619/00 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 11 September 2003

Appellant: (Proprietor of the patent)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 13 April 2000 concerning maintenance of European patent No. 0593612 in amended form.

Composition of the Board:

Chairman: A. G. Klein
Members: M. A. Rayner
M. J. Vogel

Summary of Facts and Submissions

I. The appellant (patent proprietor) lodged an appeal against the interlocutory decision of the opposition division finding European patent No. 0 593 612 (European application No. 92 914 965.6 filed as International application No. PCT/GB92/01245) as amended according to an auxiliary request to meet the requirements of the EPC.

Respondent I (opponent I) also lodged an appeal against the interlocutory decision that was subsequently withdrawn by letter dated 5 November 2001.

The oppositions filed by respondent I and by respondent II (opponent II) against the patent as a whole were based on the grounds of lack of novelty and lack of inventive step (Article 100(a) EPC) and on the grounds of insufficiency of disclosure (Article 100(b) EPC).

In the decision under appeal the opposition division held that the patent disclosed the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC), and that while the patent as amended on the basis of a main request did not comply with the requirements of Article 56 EPC, the cited prior art did not prejudice novelty and inventive step of the subject matter of the patent as amended according to the auxiliary request (Article 100(a) EPC).

II. Among the documents relied upon by the parties during the appeal proceedings, the following are pertinent to the present decision:

D1: ASTM Designation: D2765-84, 1985, pages 389 to 394: "Standard Test Methods for Determination of Gel Content and Swell Ratio of Crosslinked Ethylene Plastics"

D2: Proceedings of the 32nd International Power Sources Symposium, 9 to 12 June 1986; Electrochemical Society Inc., 1986, pages 413 to 419: "Characteristics of large sealed Ni-Cd Batteries with grafted nonwoven fabrics separator", A Kita *et al.*

D3: JP-A-57 141862 and English translation

D4: Yuasa-Jiho No. 59, 1985, pages 35 to 44: "Application of grafted nonwoven fabric separator to large sealed Ni-Cd Batteries", S Tanso *et al.*

D5: Kasenshi Kenkyu Kaishi (Journal of Chemical Fiber Research Society), Vol. 13, 1974, JP, pages 47 to 52: "Chisso Polypro Type ES-Fiber", S. Tomioka, and English translation of relevant sections

D6: Polymer Preprints, Vol. 27, 1986, pages 38 and 39: "Modification of polymer surfaces by graft copolymerization", B Rånby *et al.*

D7: Journal of Applied Polymer Science, Vol. 41, 1990, US, pages 1469 to 1478: "Surface modification by continuous graft copolymerization. IV.

Photoinitiated graft copolymerization onto polypropylene fiber surface", Z P Yao *et al.*

D8: ACS Symposium Series 364: Chemical Reactions on Polymers, eds. J L Benham *et al.*, American Chemical Society, 1988, US, pages 168 to 186: "Modification of polymers surfaces by photoinduced graft copolymerization", B Rånby *et al.*

D9: Journal of Applied Polymer Science, Vol. 40, 1990, US, pages 1647 to 1661: "Surface modification by continuous graft copolymerization. I. Photoinitiated graft copolymerization onto polyethylene tape film surface", Z P Yao *et al.*

D12: Journal of the Korean Society of Textile Engineers and Chemists, Vol. 26, No. 3, 1989, pages 18 to 25: "Photoinduced graft polymerization of acrylic acid onto isotactic polypropylene", T Y Park *et al.*

D19: Journal of Polymer Science, Polymer Letters Edition, Vol. 19, 1981, pages 457 to 462: "Photosensitized grafting on polyolefin films in vapor and liquid phases", Y Ogiwara *et al.*

III. In reply to a summons to oral proceedings issued by the Board, respondent I withdrew by letter dated 23 July 2003 all his requests and informed the Board that he would not join the oral proceedings, and the appellant submitted by letter dated 8 September 2003 amended sets of claims according to a main request and first and second auxiliary requests.

IV. Oral proceedings took place on 11 September 2003 in the absence of respondent I.

During the oral proceedings the appellant requested setting aside of the decision and maintenance of the patent in amended form on the basis of the main request filed with the letter dated 8 September 2003 or on the basis of one of auxiliary requests I, II and III filed during the oral proceedings.

Respondent II for his part requested dismissal of the appeal.

At the end of the oral proceedings the Board gave its decision.

V. Claim 1 according to the main request reads as follows:

"1. A method of making polymeric sheet for use as an electrode separator for an electrochemical device, which comprises:

(a) impregnating a non-woven fabric formed from fibres whose surface is provided by a polyolefin with a solution of a vinyl monomer capable of reacting with an acid or a base to form a salt directly or indirectly so that the product of the reaction can function as an ion exchange material, so that the fabric is impregnated with an impregnating solution comprising (i) the vinyl monomer, (ii) an initiator which initiates reaction of the polyolefin surface of the fibres when exposed to ultraviolet radiation by abstracting an atomic species from one of the reacting materials provided by the vinyl monomer and the fibre surfaces, and (iii) a solvent which comprises water and which does not

evaporate to a significant degree in the subsequent step of exposure of the fabric to radiation,

(b) exposing the fabric to ultraviolet radiation while it contains the said impregnating solution, and while exposure of the fabric to oxygen is minimised, to cause the monomer and the material of the fibres to co-polymerise and to cause the polyolefin to become crosslinked, in which homopolymerised vinyl monomer which is formed when the fabric and the impregnating solution are exposed to the ultraviolet radiation is retained in solution, and

(c) washing homopolymerised vinyl monomer which is dissolved in the impregnating solution from the fabric, in which the method is operated continuously by passing it continuously through the impregnating, irradiation and washing steps."

The set of amended claims according to the main request also includes, among others, the following dependent claims 2, 3, 4 and 6:

"2. A method as claimed in claim 1, in which the machine direction tensile strength of the separator (a) is greater than that of the fabric before the graft polymerisation reaction, or (b) is substantially unaffected by storage for 21 days in 40 % w/w potassium hydroxide at 71° C, or both."

"3. A method as claimed in claim 1 or claim 2, in which the material of the surface of at least 80 % by weight of the fibres is provided by polypropylene."

"4. A method as claimed in any one of claims 1 to 3, in which the material of the fibres is substantially homogeneous throughout the thickness of at least some of the fibres."

"6. A method as claimed in any one of claims 1 to 5, in which the thickness of the fibres is less than 30 µm, preferably less than 10 µm."

The amended set of claims according to auxiliary request I differs from the amended set of claims according to the main request only in that the expression "through the impregnating, irradiation and washing steps" of the last paragraph of claim 1 of the main request is replaced by "through the impregnation and irradiations steps".

The amended set of claims according to auxiliary request II comprises:

- a claim 1 that differs from claim 1 according to the main request in that the expression "through the impregnating, irradiation and washing steps" of the last paragraph of the claim is replaced by "through the impregnation and irradiation steps",

- an independent claim 5 directed to a polymeric sheet,

- a claim 11 directed to an electrochemical device comprising, among others, an electrode separator provided by a sheet as claimed in claim 5, and

- dependent claims 2 to 4, claims 6 to 10, and claims 12 and 13 appended to claims 1, 5 and 11, respectively,

independent claim 5 being worded as follows:

"5. A polymeric sheet which comprises a fabric formed from fibres whose surface is provided by a crosslinked polyolefin, the surface of at least 80 % by weight of the fibres being provided by polypropylene, the surface having groups bonded to it resulting from a graft-polymerisation reaction between the fibre surface and a vinyl monomer capable of reacting with an acid or a base to form a salt directly or indirectly so that the product of the reaction can function as an ion exchange material, the ion exchange capacity of the sheet (IEC meq.g^{-1}) and the gel fraction (G %) of the cross-linked material of the sheet satisfying the condition:

$$IEC \geq 0.002G + 0.05$$

the surface being wettable such as would result from initiation of the said graft-polymerisation reaction by means of ultraviolet irradiation while the fabric contains an impregnating solution of the vinyl monomer in a solvent which comprises water and which does not evaporate to a significant degree in the subsequent step of exposure of the fabric to radiation."

The wording of the claims according to auxiliary request III is not relevant to the present decision.

VI. The arguments put forward by the appellant are essentially the following:

Admissibility and clarity of amendments

The new dependent method claims were introduced as a consequence of the cancellation of the product claims in the request allowed by the opposition division and the admissibility of these dependent claims should not be affected by the reinstatement of the product claims in the sets of claims according to the main request and auxiliary request I.

According to the original disclosure the polymeric sheet is made on a continuous basis (page 8, lines 11 to 15, and page 11, lines 21 to 28) and example 2 exemplifies what is meant by continuous processing. In addition, during the manufacture of the polymeric sheet the product of the homopolymerisation reaction is removed from the sheet by washing (page 9, lines 18 to 24), and the skilled person would therefore understand the washing step as being carried out within the process of manufacture of the sheet on a continuous basis as illustrated by the continuous manufacture process embodied in example 2.

The amended claimed feature according to which the solvent comprises water is supported by claim 10 of the original application and by example 1 in which the solvent includes methoxyethanol in addition to water.

The skilled person would understand from the nature of the mechanism underlying the abstraction of atomic species induced by the initiator as specified at

lines 20 to 25 on page 10 of the original disclosure that the mechanism only involves abstracting atomic species from the polyolefin and not from the vinyl monomer.

Sufficiency of disclosure

It is well established in this field how to carry out the determination of the gel fraction and the patent specification contains examples showing how the invention can be carried out.

Novelty and inventive step

Document D3 refers to a technique for grafting acrylic acid to the polyolefin surface of a non-woven fabric in which the fabric is exposed while in contact with vinyl monomer. However, the document includes no details on the reaction conditions and on how the fabric is brought into contact with the monomer and, in addition, this technique is explicitly rejected in favour of the preferred preirradiation technique. The document requires a significant proportion of polyethylene on the surfaces of polypropylene fibres to provide sites for the graft polymerization of the fibres, and this requirement should be taken into account when considering the ES fibres described in document D5. According to the present invention, the requirement relied on in document D3 can be ignored and the resulting sheet can still be made wettable with good physical properties.

Documents D6 to D8 relate to a graft polymerisation technique using ketones such as acetone as solvent. These solvents evaporate under UV exposure and, as already acknowledged in document D8 (page 177, lines 10 to 16 of last paragraph), the choice of these solvents limits the extent of the graft reaction, especially when the material is polypropylene as taught in document D7. However, document D8 focuses, not on the solvent, but on the selection of the monomers (page 177, last paragraph) and none of documents D6 to D9, two of which (documents D7 and D9) even cite document D19 which involves the use of water as solvent, suggest using a different solvent, still less a non-volatile solvent such as water and the advantages associated therewith, i.e. the achievement of a faster and more efficient graft polymerisation.

Water is used as solvent in document D19. However, the document relates to lengthy batch reactions on non-porous films and not on fibre fabrics having interstitial surfaces. In addition, the document specifies that water is selected, contrarily to the invention, in order not to dissolve the sensitizer (page 460, penultimate paragraph) and contains no teaching on how to carry out efficient graft reactions on fibre fabrics without degrading the physical characteristics of the fabric. Similar considerations apply to document D12 (Figures 2 and 3).

The experimental reports and the calculations relied upon during the proceedings show that the techniques of documents D6 to D9 are not sufficient to achieve the appropriate ion exchange characteristics, and that higher ion exchange capacities are achievable using

water instead of acetone as solvent. The latter result can be explained in terms of the evaporation of acetone under exposure to UV radiation and the subsequent reduction of the time the fabric can be irradiated before the fabric starts to melt, so that less hydrophilic sites can be created. The surfactant of the aqueous solutions of the experimental tests is used only to impregnate the fabric with the solution, the surfactant being washed away after exposure.

VII. The arguments of respondent II in support of his requests can be summarized as follows:

Admissibility and clarity of amendments

The new dependent method claims according to the main request and auxiliary request I were not part of the granted method claims. These new claims are only dependent claims and therefore cannot serve to overcome grounds of opposition (Rule 57a EPC).

There is no support in the original disclosure for the continuous processing of the fabric as claimed, it being unclear whether the term "continuous" in the corresponding passages of the original disclosure is to be interpreted in opposition to batch-wise processing. In particular, example 2 provides no support for the inclusion of the washing step in the continuous processing of the fabric.

The amended claimed feature requiring that the solvent "comprises water", although formally supported by the wording of original dependent claim 10, is not supported by the original disclosure. In particular,

from the paragraphs bridging pages 8 and 9 of the original disclosure it becomes apparent that the solvent does not include any additional solvent component other than water.

The abstraction of atomic species "from one of" the two reaction materials provided by the vinyl monomer and the fibre surfaces according to the amended claims is unclear and not supported by the original disclosure because it would not be possible to differentiate from which of the two reacting materials the atomic species are being abstracted. In addition, the original disclosure refers to abstracting atomic species from the fibres (page 10, lines 21 to 25), and not from the fibre surfaces.

The amended independent method claims omit a feature of the subject matter of the amended claim 1 allowed by the opposition division, namely that the surface of at least 40% by weight of the fibres is provided by polypropylene. This feature was disclosed as essential in the patent specification (page 3, lines 17 and 18) and its deletion in the present claims is contrary to Article 84 EPC.

The independent claims directed to the polymeric sheet contain product-by-process features that are not formulated according to the principles established in the case law.

Sufficiency of disclosure

As shown in document D1, the standard ASTM D2765-84 specified in the patent specification for the determination of the gel fraction relates to polyethylene and not to polypropylene plastics as required by the claimed subject matter and in addition the standard describes three different methods which provide different results. Furthermore, the claim specifies a correlation condition between two properties (the ion exchange capacity and the gel fraction) that cannot be appropriately determined in an accurate and verifiable manner and consequently the skilled person does not know when he is working within the area expressed by the claimed condition in the sense of decisions T 225/93 and T 256/87 discussed in chapter II, section A-4 of "Case Law of the Boards of Appeal" 4th edition 2001. For these reasons, the requirements of Article 83 as well as those of Article 84 EPC are not satisfied.

Novelty and inventive step

The subject matter of the independent method claims according to the different requests differs from the disclosure of document D3, if at all, by minor process design options which are not explicitly mentioned in the document in connection with the simultaneous irradiation method. However, these design options are derivable from the alternative embodiment relative to the preirradiation method as set forth in the example in which the grafting reaction is carried out in an aqueous solution under nitrogen gas.

As regards the claimed polymeric sheets, the surface of the propylene fibres of document D3 is covered with polyethylene "completely or partially", the latter alternative still including the possibility that the fibres are covered by polyethylene only to a degree of 20% by weight, thus resulting in a propylene content of the fibre surface overlapping with the claimed range. Alternatively, the claimed polypropylene surface content is anticipated in document D3 by the "ES fibres" referred to in the document, which fibres can also be made of mainly polypropylene according to Table 3 on page 7 of document D5. In addition, values of the ion exchange capacity well above the claimed values are typical in separators for batteries (see Figure 4 of document D2 and Figure 6 of document D4), and the disclosure of a separator for batteries as intended by document D3 presupposes a value of the ion exchange capacity of at least 0.05 meq g^{-1} which is the possible minimum value of the claimed invention.

With regard to inventive step, and starting with document D3 as the closest prior art, documents D6 to D9, and in particular document D8, show that the simultaneous UV radiation method in nitrogen atmosphere provides a continuous and efficient method of grafting vinyl monomer onto the surface of polyolefin fibres, especially onto polypropylene fibres. In addition, the documents provide information on how the grafting level can be increased and optimized, in particular in terms of the polyolefins and the monomers to be used, the monomer concentration and the irradiation time.

As to the use of water as solvent, document D8 acknowledges the disadvantages of the evaporation of acetone (page 177, lines 10 and 11 of the last paragraph). This is a clear incentive to look for alternatives, and in particular for solvents that do not evaporate such as water that is used in documents D3, D12 and D19. In particular, in document D12 high grafting yields on polypropylene are obtained by means of an impregnating aqueous solution of vinyl monomer and benzophenone (paragraphs bridging the two columns on page 19, and discussion of Figure 3) and a reinforcing effect on the polymer is also achieved at an appropriate grafting yield (Table 3 and last paragraphs on page 23), and document D19 reports high levels of grafting on polypropylene films based on an aqueous solution of vinyl monomer and on the extraction of the homopolymer by washing (introducing paragraphs on page 457, and Table II), the grafting levels being proportional to the water content in the solution (pure water and the ethanol-water systems in Table II and discussion on page 460). Although in document D19 the sensitizer is precoated, from the first paragraph of the document it is evident that the sensitizer can also be dissolved in the solvent together with the monomer as taught in document D12. The results in documents D12 and D19 are based on films but can be extended to fibres, whereby a more efficient grafting rate can be expected in view of the greater exposed surface area presented by the materials of the fibres. In addition, the radiation times depend on the materials and can be reduced by adjusting the process conditions.

As regards the claimed sheet, document D8 stresses that the grafting of polypropylene fibres is readily achievable in a uniform manner. Accordingly, the polyethylene coverage ratio of the partially covered polypropylene fibres of document D3 can be reduced in order to take advantage of the physical properties of polypropylene (document D3, page 3, central paragraph). The skilled person would therefore consider applying the measures proposed in documents D6 to D9, and in particular in document D8, and since the grafting levels that are then achievable are sufficient to fall within the claimed value range of the ion exchange capacity, he would automatically arrive at the claimed sheet.

The experimental results presented by the appellant are based on aqueous solutions comprising a surfactant that is absent in the claimed subject matter and also in the acetone-based solutions considered in the experimental tests. Therefore, the corresponding results do not support that water-based solutions lead to a better wettability. On the contrary, the own experimental report show that the same ion exchange characteristics that are obtainable with aqueous solutions can also be obtained with acetone-based solutions without melting of the fabric.

Similar considerations apply if document D8 is alternatively identified as the closest prior art.

VIII. During the appeal proceedings respondent I filed submissions in support of his initial requests, which requests were subsequently withdrawn.

Reasons for the Decision

1. The appeal filed by the appellant is admissible.

2. *Procedural matters*

The withdrawal of the appeal initially filed by respondent I (point I above) has the effect that he ceased to be an appellant. He nonetheless remains party to the appeal proceedings as of right pursuant to Article 107 EPC, second sentence. In addition, since respondent I subsequently withdrew all his requests without submitting new requests (point III above), the facts and arguments submitted by respondent I during the appeal proceedings in support of his initial requests are - unless otherwise considered appropriate by the Board (Article 114(1) EPC) - disregarded in the following.

3. *Main request - Compliance of the amendments with the requirements of Article 123(2) EPC*

According to the passage at lines 11 to 15 on page 8 of the publication of the international application published under the PCT as WO-A-93 01622 (referred to in the following as the original application) "the method of the invention has the advantage that a polymeric sheet can be made [...] on a continuous basis", whereby by "the method of the invention" is meant the "method of making a polymeric sheet" previously defined in the paragraphs bridging pages 7 and 8 of the original application and which method encompasses both the impregnating and the exposing

steps. In addition, the manufacture of the separator according to example 2 involves passing a strip of fabric around rollers located in a chamber so that the fabric passes through an impregnating solution and then passing the impregnated fabric between two exposure lamps positioned one on each side of the chamber. Therefore, contrary to the submissions of respondent II, there is a clear and unambiguous basis in the original disclosure for the continuous processing of the fabric through the impregnating and irradiation steps according to the amended feature of claim 1 of the main request.

However, no washing step is mentioned in the "method of making a polymeric sheet" defined in the paragraphs bridging pages 7 and 8 of the original application. Washing of the exposed fabric is first considered on page 9, lines 18 to 24 on page 9. In addition, the reference on page 11, lines 21 to 28 of the original application to "the irradiation process to be run continuously" is also confined to the irradiation process of the impregnated fabric. As to example 2, the original application merely specifies that "the fabric was then washed" without further details on the processing of the fabric through the washing step.

In the absence of any express or implied indication in the original application towards the inclusion of the washing step in the continuous processing of the fabric through the impregnation and irradiations steps, the Board concludes that the skilled person would not have derived the subject matter of the amended claim 1 directly and unambiguously from the content of the application as originally filed (Article 123(2) EPC).

Accordingly, the main request is not allowable under Article 123(2) EPC.

4. *Auxiliary request I - Compliance of the amendments with the requirements of Rule 57a EPC*

Amended claim 1 of auxiliary request I omits the washing step in the continuous processing of the fabric and for this reason the objection under Article 123(2) EPC put forward in point 3 above with regard to claim 1 of the main request does not apply to this request.

However, while method claim 1 and dependent claims 5, 7 and 8 of auxiliary request I directed to a method of making a polymeric sheet are the counterpart of independent method claim 10 and dependent claims 12 to 14 as granted, respectively, dependent method claims 2, 3, 4 and 6 of auxiliary request I have no counterpart in the set of claims as granted. The appellant's submission that the new method dependent claims 2, 3, 4 and 6, the features of which correspond essentially with the features defined in dependent claims 2, 3, 4 and 6 as granted directed to a polymeric sheet, have been introduced as a consequence of the deletion of the product claims during the first-instance opposition proceedings cannot be followed because the corresponding product claims 1 to 6 as granted have been now reinstated in present auxiliary request I as claims 9 to 14 also directed to a polymeric sheet.

In the absence of any particular circumstance that might justify the inclusion of the new dependent method claims 2, 3, 4 and 6, and since amendments to a granted patent during opposition proceedings are admissible only if the amendments are appropriate and necessary and in particular if they are occasioned by grounds for opposition (Rule 57a EPC), the Board concludes that the new dependent claims according to auxiliary request I are not admissible (see in this respect *"Case Law of the Boards of Appeal"* 4th edition 2001, chapter VII, section C-10.1.4).

Consequently, the amendments according to auxiliary request I are not admissible under Rule 57a EPC.

5. *Auxiliary request II*

5.1 Compliance of the amendments with Articles 123(2) and 84 EPC

5.1.1 Amendments: claim 1

The subject matter of claim 1 according to auxiliary request II results from the combination of the features of claims 10 and 11 as granted, the resulting combination further specifying the suitability of the polymeric sheet for use as an electrode separator for an electrochemical device and the crosslinking of the polyolefin as supported respectively by the first paragraph and the passage at lines 27 to 32 on page 10 of the original application.

The amended features relating to the continuous processing of the fabric through the impregnating and irradiation steps are in the Board's view, and contrarily to the submissions of respondent II, clearly supported by the disclosure of the original application, see first paragraph of point 3 above.

The amended features of the claim relating to the initiator are supported by the passage at lines 20 to 25 on page 10 of the original application. The submission of respondent II that there is no basis in the original disclosure for the initiator abstracting atomic species from the fibre surfaces cannot be followed because the skilled person would readily understand in the context of the original disclosure (see for instance page 7, lines 11 and 12) that the "reacting material" of the fibres, i.e. the material of the fibres involved in the polymerisation reaction is constituted by the material of the fibre surface. The further submission of respondent II with regard to the feature according to which the atomic species are abstracted "from one of the reacting materials" cannot be followed either because the feature is fully supported by the passage at lines 20 to 25 on page 10 of the original application (Article 123(2) EPC) and, as to the requirements of Article 84 EPC are concerned, the amended feature is supported by the description and in addition, as confirmed by the appellant's submissions, the skilled person would readily recognise, according to the reactivity characteristics of the initiator in use, which of the reacting materials is susceptible of having atomic species being abstracted therefrom.

The further amendments relative to the homopolymerised vinyl monomer and the washing step of the same are supported by the passage at lines 18 to 24 on page 9 of the original application. The submission of respondent II that the original disclosure would not support "a solvent which comprises water" does not convince the Board because according to original dependent claim 10 "the solvent comprises water" and example 1 relates to an impregnating solution containing, in addition to water as solvent, 12.5% by weight of methoxyethanol which also constitutes a solvent component having the characteristics of the solvent of the claimed method.

As regards the further submission of respondent II relative to the omission in present claim 1 of features relating to the polypropylene content of the fibre surface, such features were, as far as the manufacturing method of the polymeric sheet is concerned, not explained as essential either in the original disclosure (page 4, lines 12 to 18 and independent claim 9 of the original application) or in the patent specification (independent claim 10 as granted and page 4, line 17 to page 6, line 3) and in this respect the Board does not see in this omission any contravention of Article 123(2) or 84 EPC. In addition, contrarily to the contention of the respondent, no other conclusion ought to be derived from the inclusion of the corresponding features in the amended method claim 1 allowed by the opposition division since there is no legal basis or procedural principle in the EPC that would in the present case, where the proprietor of the patent is the appellant, bar the latter from pursuing claims which are broader

than those held allowable by the opposition division (see *"Case Law of the Boards of Appeal"* 4th edition 2001, chapter VI, section I-3.1.2, subsection (bb)-(3)).

5.1.2 Amendments: claim 5

The subject matter of independent claim 5 results from claim 1 as granted after replacement of the expression "at least 40 % by weight" by "at least 80 % by weight" as supported by the passage at lines 12 to 15 on page 4 of the original application and further specifying the wettable characteristics of the fabric as supported by the first paragraph of the original application, the claim further including the features relative to the solvent as discussed in point 5.1.1 above with regard to the corresponding amendments to claim 1.

The contention of respondent II that the amended product-by-process features of claim 5 have not been formulated as required by the established case law cannot be considered by the Board in view of the fact that the corresponding amendments relate to a product-by-process feature already present in the corresponding granted claim and the formulation of which is not open to objection under Article 84 EPC during opposition proceedings, the requirements under Article 84 EPC not constituting a ground for opposition under Article 100 EPC.

5.1.3 Amendments: claims 2 to 4 and 6 to 13

Claim 11 is directed to an electrochemical device including an electrode separator provided by a sheet as claimed in claim 5 and corresponds with claim 7 as granted which contains a reference to the sheet defined in claim 1 as granted. The features of dependent claims 2 to 4, claims 6 to 10, and claims 12 and 13 correspond with the features of dependent claims 12 to 14, claims 2 to 6, and claims 8 and 9 as granted, respectively.

5.1.4 Compliance of the granted claims themselves with the requirements of Article 123(2) EPC was not disputed by the respondents. It follows that the amendments to the granted claims according to auxiliary request II comply with the requirements of Articles 123(2) and 84 EPC.

5.2 Compliance of the amendments with Article 123(3) and Rule 57a EPC

The amendments according to auxiliary request II have been made in order to overcome the grounds of opposition invoked by the respondents and, in addition, result in a limitation of the scope of protection of the claims as granted. The Board is therefore satisfied that the amendments to the claims according to auxiliary request II comply with Rule 57a and Article 123(3) EPC.

5.3 Sufficiency of disclosure

The definition of the polymeric sheet according to independent claim 5 involves, among others, the value of the gel fraction of the sheet, which value is measured according to the patent specification on the basis of ASTM D2765-84 (page 3, line 14). Respondent II has submitted that according to the standard test method ASTM D2765-84 reported in document D1 this standard is used for the determination of the gel content of crosslinked ethylene plastics, and not for that of propylene as required by the claimed subject matter, and that in addition the standard discloses in fact three different methods of determination.

However, the fact that the standard test method ASTM D2765-84 refers to the determination of the gel content of crosslinked ethylene plastics does not necessarily imply in the Board's view that the method would be inappropriate or unsuitable for the determination of the gel content of the crosslinked polyolefin material of the surface of fibres when the surface of at least 80% by weight of the fibres is provided by polypropylene. In addition, none of the submissions of the parties would allow the conclusion that the application of the standard ASTM D2765-84 to the determination of the gel fraction of the crosslinked material as claimed would represent an undue burden for the man skilled in the art.

In addition, the fact that the standard ASTM D2765-84 includes different methods and does not therefore uniquely determine the value of the gel fraction does not *per se* represent an undue burden either (see in

this respect T 492/92, point 3.3 of the reasons, T 378/97, point 2.4.1 of the reasons, and T 930/99, point 1 of the reasons, all of them unpublished). In particular, in the absence of evidence that the different methods specified in the standard would lead to determination values deviating from each other by a substantial amount having technical significance (see T 378/97, *supra*, point 2.4.1 of the reasons) or by an amount that would place the skilled person in a situation where he is unable to carry out the invention (see T 930/99, *supra*, point 1 of the reasons), the mere fact that the patent specification is silent as to which of the specific methods encompassed by the standard ASTM D2765-84 is to be used does not in the Board's view prejudice sufficiency of disclosure.

The question of whether the methods defined by the standard ASTM D2765-84 lead to a unique value or to different values of the gel fraction also concerns the clarity of the definition of the subject matter of claim 5 relying on the value of the gel fraction (Article 84 EPC); however, since Article 84 EPC does not constitute an admissible ground for opposition under Article 100 EPC and the algebraic condition defined in present claim 5 and involving the value of the gel fraction was already present in claim 1 as granted, the Board has no power to consider this issue.

Respondent II has referred to decisions T 225/93 and T 256/87, *supra*, in support of his submissions. However, in decision T 225/93 the different methods known in the prior art led, contrarily to the present case, to substantial different results which did place, in the particular circumstances of that case, the

skilled person in a situation where he was unable to carry out the invention (see point 2.3 of the reasons of the decision). As to decision T 256/87, this decision rather corroborates the Board's view set forth above that failure to specify a method of determining a parameter is not in itself sufficient to put into question the reproducibility of the invention (see point 17 of the reasons of the decision), the requirement relating to the skilled person knowing when he was working "within the forbidden area of the claims" being addressed in T 256/87 within the simultaneous assessment of Articles 83 and 84 EPC (point 17 of the reasons) and relating by its very nature, not to a requirement under Article 83 EPC, but to the clarity of the claims within the meaning of Article 84 EPC (see in this respect T 960/98, unpublished, point 3.8.3 of the reasons, and T 930/99, *supra*, point 1 of the reasons).

Accordingly, the Board concurs with the opposition division that the opposition ground under Article 100(b) EPC is unfounded.

5.4 Novelty of the claimed subject matter

5.4.1 Document D3 discloses a polymeric sheet constituted by a hydrophilic non-woven fabric for use as a separator for batteries, the fabric being made of polypropylene resin fibres the surface of which is provided with polyethylene resin and is rendered hydrophilic by graft copolymerization with vinyl monomer which can directly or indirectly form salt by being reacted with an acid or a base (see claim and two first paragraphs of the description of the English translation). The

polypropylene fibres are said to be covered by polyethylene completely or partially, and reference is made to the deposition of the polyethylene resin on the surface of the fibre by an extrusion process, the resulting fibre being "commercially provided by Chisso K. K. as ES fibre" (last paragraph of page 3 of the translation). The document also proposes carrying out the graft polymerization by one of three alternative methods. Among these methods, the so-called "simultaneous irradiation method" consists in the irradiation by UV rays or ionizable gamma rays of the non-woven fabric while being in contact with vinyl monomer, and the "preirradiation method" consists in the irradiation of the fabric by UV or by ionizable gamma rays before the fabric is brought into contact with vinyl monomer (first paragraph of page 4 of the translation). The latter method is said to be especially preferable (page 4, lines 17 to 19) and the sole example of the document is based on this method.

It follows from the above that the method according to claim 1 conforms, not to the preferred preirradiation method, but to the less preferred simultaneous method described in document D3, and differs from the variant of the simultaneous method involving the use of UV rays in that the fabric is brought into contact with the monomer by impregnating the fabric with a solution containing, in addition to the monomer, an initiator and a solvent as claimed, together with the minimisation of exposure of the fabric to oxygen during irradiation of the sheet, the subsequent washing step of the resulting homopolymerised vinyl monomer, and the continuous processing of the fabric through the impregnation and irradiation steps. In addition, the

document fails to explicitly specify the crosslinking of the polyolefin.

The contention of respondent II that features of the example of document D3 such as the use of an aqueous solution of acrylic acid and the washing of the fabric after irradiation (paragraph bridging pages 4 and 5) are to be included in the simultaneous method according to document D3 cannot be followed in view of the fact that the example illustrates the preirradiation method based on irradiation with an electron beam (page 4, last line) and the details of this method cannot be considered to be automatically disclosed also in conjunction with the simultaneous method, in the absence of any express disclosure to this effect and in view of the different, non-equivalent characteristics of the two methods.

Having regard to the above, the subject matter of claim 1 is novel over the disclosure of document D3.

5.4.2 Independent claim 5 defines a polymeric sheet comprising a fabric formed from fibres and requires that the surface of at least 80% by weight of the fibres is provided by polypropylene. The fabric disclosed in document D3, however, is made of polypropylene fibres and the document requires that the fibres are covered "completely or partially" by polyethylene (claim and last paragraph on page 3) in view of the fact that the graft polymerisation of vinyl monomer on polypropylene is much slower and involves higher costs than the graft polymerisation on polyethylene (page 3, two last paragraphs and page 5, lines 7 to 13). In the light of this clear technical

teaching, the skilled person seeking to implement the disclosure of document D3 would in the Board's view provide polyethylene as the major component of the surface material of the polypropylene fibres and for this reason the submission of respondent II that the skilled person would contemplate "partially" covering the surface of the polypropylene fibres with polyethylene by only an amount of 20% or less as to anticipate the polypropylene surface content required by the claimed subject matter fails to convince the Board.

The further submission of respondent II that the polypropylene content of the fibre surface as claimed is anticipated in document D3 by the reference in the document to the fibres "provided by Chisso K. K. as ES fibres" (page 3, last paragraph) which are described in document D5 does not persuade the Board either. Document D5 discloses the so-called "Chisso Polypro Type ES-fibre" as being constituted by fibres of the "side-by-side type", the side segments being respectively composed of mainly polyethylene and mainly polypropylene (sections 2.1 and 3 of the English translation and definition of the "PE/PP" fibres in Table 1), i.e. by fibres having only half of the surface provided by polypropylene. As to Table 3 of document D5 showing the characteristics of ES fibres and ES non-woven fabrics, the table includes, among others, a reference to non-woven fabrics "possibly made from 100 % polyolefin (mainly PP)"; however, even if it were assumed that these fibres would have also polypropylene as main component of their surfaces, the fibres would be at variance not only with the requirement of document D3 that the fibres of

polypropylene are covered by polyethylene but also with the reference in the document to the "ES fibres" as resulting from the deposition of polyethylene on the surface of polypropylene fibres following an extrusion process (page 3, last paragraph), and for this reason the skilled person would not consider these particular fibres of document D5 as falling within the ES fibres referred to in document D3.

Accordingly, and irrespectively of whether the sheet disclosed in document D3 anticipates explicitly, or is intrinsically endowed with the remaining structural features of the claimed sheet such as the crosslinking of the polyolefin, the ion exchange capacity of the fabric and any distinguishable characteristics that might be derivable from the product-by-process features defined in claim 5, the subject matter of claim 5 is novel over the disclosure of document D3 at least by virtue of the surface of at least 80% by weight of the fibres being provided by polypropylene.

5.4.3 The series of documents D6, D7, D8 and D9 relates to the modification of polymer surfaces following a technique of UV induced graft polymerization. According to document D8 - a more detailed version of document D6 - surface grafting of materials of polyethylene and polypropylene is carried out in a continuous process in a nitrogen atmosphere chamber by means of exposure to UV radiation after the material is passed through a presoaking solution of an initiator (benzophenone) and a monomer (acrylic or methacrylic acid) dissolved in acetone, whereby the initiator abstracts hydrogen from the polymer so as to induce graft polymerization and crosslinking, the homopolymer produced during the

reaction being washed from the material after the irradiation step (Figure 2 and page 186 together with the two items "2." on page 169, section "Materials" on page 171, section "Results and Discussion" on pages 171 and 172, and last sentence of the first paragraph on page 174). Documents D7 and D9 disclose essentially the same process applied to the graft polymerization of polypropylene fibre surfaces and polyethylene type film surfaces, respectively (see title of the documents).

Documents D6, D7, D8 and D9, however, relate to the graft polymerization of sheets, tape films, fibres and fibre bundles (penultimate sentence of the abstracts of D6 and D8, last paragraph on page 1470 of document D7, and last paragraph on page 1648 of document D9) and none of the documents refers to sheets constituted by a fabric formed from fibres, nor to the graft polymerization of such sheets. Already for this reason, none of these documents anticipate the subject matter of claims 1 and 5.

5.4.4 As is apparent from the parties' submissions, the remaining documents are less relevant for the issue of novelty of the claimed subject matter.

5.4.5 Having regard to the above, the subject matter of claims 1 and 5 amended according to auxiliary request II as well as that of claim 11 directed to an electrochemical device comprising an electrode separator provided by a sheet as claimed in claim 5, and that of claims 2 to 4, claims 6 to 10 and claims 12 and 13 appended respectively to claims 1, 5 and 11 is novel over the disclosure of the prior art considered during the proceedings (Articles 52(1) and 54 EPC).

5.5 Inventive step of the claimed subject matter

5.5.1 It has been undisputed by the parties that document D3 represents the closest prior art with regard to the subject matter of claims 1 and 5.

The contention of respondent II that document D8 also qualifies as alternative closest prior art cannot be followed. Document D8 merely relates to the modification of the surfaces of polymer materials such as tapes and fibre bundles (point 5.4.3 above) and there is *a priori* no reason why the skilled person would see in this document a starting point for the achievement of the primary object considered in the patent, i.e. the provision of sheets with the wettable and ion exchange characteristics required for the use of the sheets as separators in electrochemical devices (first paragraph of the patent specification). Accordingly, document D8 does not qualify as a realistic starting point for the objective assessment of the inventive step of the claimed subject matter.

5.5.2 Document D3 already solves the primary problem considered in the patent, i.e. the provision of a sheet having good physical properties and the appropriate hydrophilic and ion exchange characteristics for use as electrode separator (page 2, lines 3 to 16 and 21 to 32, and page 3, lines 1 to 12 of the patent specification), by means of a fibre fabric processed by graft polymerisation of vinyl monomer (D3, page 2, first and second paragraphs and page 3, second paragraph). Among the three methods of graft polymerization proposed in document D3 (see point 5.4.1 above), the preirradiation

method is said to be especially preferred for the reason that in this method the vinyl monomer is not irradiated and thus no independent polymer is produced (page 4, lines 17 to 19). In view of this clear and unequivocal teaching, the man skilled in the art, aware of the adverse effects on the characteristics of the graft polymerised fabric of the production of independent polymer, would be reluctant to follow and further develop any of the two other methods proposed in document D3, and in particular the simultaneous irradiation method on which the graft polymerization method according to claim 1 is based. This finding constitutes in the Board's view a first indication of the presence of an inventive step.

If, nonetheless, the skilled person would have been concerned with further elaborating the less preferred simultaneous method mentioned in document D3 and assuming for the sake of argument that he would have selected UV radiation for carrying out the exposure of the fabric, he would then have been straight away confronted, by virtue of the explicit teaching of document D3 (page 4, lines 17 to 19), with the problem of preventing the adverse effects on the characteristics of the fabric of the accumulating homopolymerisation product of the monomer produced in the simultaneous polymerisation method. This problem is also mentioned in the patent specification (page 4, lines 36 to 42 and 54 to 57) and is solved according to the method defined in claim 1 by the distinguishing features identified in point 5.4.1 above other than the feature relative to the continuous processing of the fabric through the impregnating and irradiation steps, the latter feature having as effect the manufacture of

the sheet in a quick and continuous manner (see page 4, lines 33 to 35 and page 5, lines 3 to 11 and 35 to 38 of the patent specification) and therefore solving a different problem, namely the improvement of the efficiency of the manufacturing method of the sheet.

According to the submissions of respondent II the skilled person would be induced by the disclosure of documents D6 to D9 (see point 5.4.3 above) to carry out the simultaneous irradiation method disclosed in document D3 under the conditions disclosed in documents D6 to D9. However, even if it were assumed that the skilled person would see in the teaching of these documents a solution to the first of the problems formulated above, he would not arrive at the method according to claim 1 because documents D6 to D9 rely on ketones as solvents, and more particularly on acetone (document D7, page 1475, middle paragraph), i.e. on volatile solvents which evaporate during the graft reaction and, as acknowledged in these documents, restrain the extent of the reaction (document D8, page 177, lines 10 to 16 of the last paragraph, document D7, page 1473, lines 11 to 15, and document D9, page 1655, fourth paragraph from the bottom). In addition, as submitted by the appellant, these documents are silent as to the alternative use of water or other solvent which does not evaporate to a significant degree during irradiation of the sheet and do not suggest either that the use of a non-volatile solvent allows for an improved control of the thermal conditions and the reaction time of the graft polymerisation reaction.

Respondent II has submitted in this respect that water is a common solvent used in this field as shown in documents D3, D12 and D19 and that the skilled person would readily contemplate water as an obvious alternative to acetone. However, document D3 discloses water as solvent in an example illustrating the graft polymerization by the preirradiation method (page 5, lines 1 to 4) in which no homopolymer is produced (page 4, middle paragraph) and the skilled person would see no incentive for the incorporation of features of the example into the simultaneous method in view of the different, non-equivalent characteristics of the two methods. Document D12 reports on the photoinduced graft polymerization of acrylic acid onto polypropylene films (abstract and section "Experimental"); grafting of polypropylene, however, runs counter to the disclosure of the closest prior art document D3 requiring polyethylene on the surface of polypropylene fibres to improve the grafting efficiency (central paragraph on page 3), and in addition no disclosure can be found in document D12 identifying any technical significance or particular advantage associated with the use of water as solvent. Document D19 also reports on the photoinduced grafting of hydrophilic monomers in aqueous solution onto films of polypropylene and polyethylene (second paragraph of the abstract and section "Photografting"). However, in document D19 the sensitizer is coated on the film before a solution is applied (first paragraph of section "Experimental") and the document requires the use of water as solvent so that the sensitizer coating safely stays on the film surface during the grafting process without dissolution (page 460, lines 2 and 3 of the third paragraph). In view of the different functions of water and acetone in

the respective grafting techniques followed in document D19 and in documents D6 to D9, the person skilled in the art would see no incentive to replace acetone by the solvent used in document D19. Consequently, the person skilled in the art would not see in documents D3, D12 and D19 any obvious incentive to modify the application of the grafting techniques of documents D6 to D9 to the simultaneous method disclosed in document D3 by replacing acetone by water as solvent nor any suggestion towards other supplementary effects achieved by the use in that method of the solvent having the claimed characteristics (page 4, lines 36 to 42 of the patent specification).

As none of the documents teach or suggest the combination of measures according to claim 1, there is no basis for the Board to conclude that the required inventive step is lacking. The parties' submissions on the potential effects of the use of water instead of acetone-based solutions on the characteristics of the resulting fabric, in particular on the ion exchange capacity levels that can be achieved with the techniques of documents D6 to D9, and based on the respective experimental reports and calculations go beyond what is necessary for reaching this conclusion and for this reason the corresponding submissions are not considered any further.

In view of this conclusion, the Board does not consider it necessary to comment on the inventive merit of the distinguishing features relative to the continuous processing of the sheet and solving the second of the problems identified above.

5.5.3 According to claim 5 at least 80% by weight of the fibres making up the fabric of the polymeric sheet have their surfaces provided by polypropylene, the sheet possessing in addition features - such as the ion exchange characteristics expressed by the algebraic condition specified in the claim - that render the sheet suitable for use as electrode separator (see patent specification, page 2, lines 21 to 35 and 58, and page 3, lines 1 to 19, and lines 39 to 43). The claimed value of the polypropylene content of the fibre surfaces clearly departs from the teaching of the closest prior art document D3 requiring polyethylene, i.e. a material having inferior physical properties but a higher reactivity to graft polymerization with vinyl monomer than polypropylene, as a main component of the surface of polypropylene fibres (page 3, two last paragraphs and page 5, lines 7 to 13). This technical teaching would in the Board's view dissuade the skilled person from further considering the possibility of achieving suitable grafting levels and the appropriate ion exchange characteristics with fabrics made of fibres having polypropylene as the main component of the fibre surface. In addition, none of the documents considered during the appeal proceedings suggest a reasonable expectation of success towards fabrics of fibres having polypropylene as the main component of the fibre surface and having the appropriate ion exchange characteristics to the extent that the skilled person would (and not just could) have seen a possibility of overcoming the clear and consistent technical teaching of the closest prior art document D3 with regard to the use of polyethylene as a main component of the fibre surface. In particular, document D19 teaches a higher grafting degree for

polyethylene films than for polypropylene films (see Figure 3) and would therefore confirm the teaching of document D3 in this respect, and document D12 reports on the improvement of the moisture and swelling properties and of the rigidity of isotactic propylene films grafted with acrylic acid at the expense, however, of the crystallinity and the mechanical properties of the film (abstract and page 221, second column, lines 14 to 41).

The line of argument of respondent II relies on the uniform grafting of polypropylene fibres reported in document D8 that would be seen by the skilled person as an indication that the polyethylene content of the surface of the polypropylene fibres as required by document D3 can be reduced in favour of the polypropylene content and the physical properties associated with this material. However, as stressed by the appellant during the proceedings, document D8 does not contain any clear or promising indication towards the efficient grafting of vinyl monomer on polypropylene surfaces to the extent that the resulting graft polymerised fibres would be suitable for fibre fabrics having the characteristics required for their use as electrode separators. On the contrary, document D8 clearly indicates that grafting with the corresponding techniques is more efficient and easier on polyethylene than on polypropylene (D8, page 174, third paragraph), a result that was subsequently confirmed by the relatively low graft yields on polypropylene reported by one of the authors of the document in document D7 (paragraph bridging pages 1471 and 1472). Consequently, contrarily to the argument of respondent II, the skilled person would not see in the

disclosure of document D8 an invitation to depart from the teaching of document D3 relating to polyethylene as main component of the fibre surfaces, but rather a confirmation of this teaching.

In view of the above, the polymeric sheet defined in independent claim 5 involves an inventive step. The rationale behind this conclusion relies on the achievement of suitable levels of the ion exchange capacity for fibre fabrics having the claimed polypropylene fibre surface content without detriment to the physical properties of the fabric and for this reason the parties' submissions, including experimental reports and calculations, concerning the question of whether the claimed values of the ion exchange capacity are also achieved in document D3 or whether they can also be achieved with the grafting techniques of documents D6 to D9 are not pertinent for the conclusion reached above.

5.5.4 Having regard to the above, the subject matter of claims 1 and 5 amended according to auxiliary request II as well as that of claims 2 to 4 and 6 to 13 referring back to claims 1 and 5, respectively, involves an inventive step with regard to the prior art considered during the proceedings (Articles 52(1) and 56 EPC).

6. In view of the positive conclusion reached by the Board with regard to the set of claims according to auxiliary request II of the appellant, consideration of the set of claims according to auxiliary request III is not necessary in the present decision .

7. *Further procedure - Adaptation of the description*

In view of the positive conclusion reached by the Board with regard to the claims according to appellant's auxiliary request II, the Board considers it expedient in the circumstances of the present case to exercise its discretion under Article 111(1) EPC and to remit the case to the department of first instance for adaptation of the description. In adapting the description, care should be taken to amend statements and embodiments that are no longer fully consistent with the restricted subject matter now claimed (Article 84 and Rule 27(1)(c) EPC), it being noted that not all the essential features of the subject matter according to independent claims 1 and 5 are common to both claims.

8. *Absence of respondent I at the oral proceedings*

The present decision relies on sets of claims amended during the oral proceedings and differing from the sets of claims previously submitted by the appellant and notified to respondent I only in the deletion in claim 1 according to auxiliary requests I and II of the washing step in the continuous processing of the sheet. This amendment was made by the appellant in response to objections already raised by respondent II prior to the oral proceedings. In such a situation respondent I, who informed the Board of his intention not to attend the oral proceedings at the time he withdrew all his requests, could not have been taken by surprise, because he had reasonably to expect that the appellant would try to overcome such objections by appropriate amendment of the claims. Consequently, the Board holds

that the present decision does not conflict with Article 113(1) EPC and that the absence of respondent I at the oral proceedings did not prevent the Board from taking this decision at the end of the oral proceedings pursuant to Article 11(3) of the amended Rules of Procedure of the Boards of Appeal that entered into force on 1 May 2003 (OJ EPO 2003, 89).

9. In view of the foregoing, the patent can be maintained as amended according to the appellant's auxiliary request II (Article 102(3) EPC), subject to the adaptation of the description as indicated in point 7 above.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of

   - claims 1 to 13 of the auxiliary request II filed during the oral proceedings, and

   - description to be adapted.

The Registrar: The Chairman:

P. Martorana A. G. Klein