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Case Number: T 2377/12 - 3.3.06

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Language of the proceedings: EN

Title of invention:
COMPOSITE MATERIALS COMPRISING SUPPORTED POROUS GELS

Patent Proprietor:
Natrix Separations Inc.

Opponent:
Pall Corporation

Headword:
Supported porous gel / NATRIX

Relevant legal provisions:
EPC Art. 83, 114(2)

Keyword:
Sufficiency of disclosure - All Requests (no)
Technical submissions made at the oral proceedings disregarded - not submitted in due time - new complex issues raised

Decisions cited:

Catchword:

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Case Number: T 2377/12 - 3.3.06

D E C I S I O N
of Technical Board of Appeal 3.3.06
of 13 December 2016

Appellant: (Patent Proprietor)	Natrix Separations Inc. 5295 John Lucas Drive Unit 6 Burlington ON L7L 6A8 (CA)
Representative:	Graf von Stosch, Andreas Graf von Stosch Patentanwaltsgesellschaft mbH Prinzregentenstraße 22 80538 München (DE)
Respondent: (Opponent)	Pall Corporation 25 Harbor Park Drive Port Washington, NY 11050 (US)
Representative:	Hoeger, Stellrecht & Partner Patentanwälte mbB Uhlandstrasse 14c 70182 Stuttgart (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 17 October 2012 revoking European patent No. 1617936 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman B. Czech
Members: P. Ammendola
C. Heath

Summary of Facts and Submissions

I. This appeal is against the decision of the Opposition Division revoking European patent No. 1 617 936.

II. Claim 1 of the patent as granted directed to a "*composite material*" characterised *inter alia* in that it "*comprises a "macroporous cross-linked gel located in and filling the pores of [a] porous support member*".

III. The patent had been opposed, *inter alia*, on the ground of insufficiency of disclosure. In this respect, the Opponent considered *inter alia* that the opposed patent did not teach how the occurrence of the feature "*said macroporous gel has a volume porosity of the macroporous gel between 30 and 80%*" could be determined (herein below the volume porosity of the macroporous gel is referred to as **MG-Porosity**).

IV. This objection did not convince the Opposition Division (decision under appeal, Reasons, 5.2), in particular because of the instruction on how to prepare the composite material in paragraph [0102] and of a formula given in paragraph [0236] of the patent in suit.

The disclosure in the patent was, however, found insufficient having regard to another feature of claim 1, according to which said macropores must "*have an average size between 25 and 1500 nm*". This last finding being applicable to all the then pending claim requests of the Patent Proprietor, the Opposition Division concluded that these were all objectionable under Article 83 EPC and revoked the patent.

V. In its statement of grounds, the **Appellant** (Patent Proprietor) defended the patent in the amended versions

dealt with in the decision under appeal.

VI. In its reply dated 30 July 2013 (see points "e)" and "f)" on page 10), the **Respondent** (Opponent) reiterated the insufficiency objections raised before the Opposition Division, *inter alia* as regards the alleged lack of information on how to determine the occurrence of the MG-Porosity feature.

VII. With letter of 22 January 2014, the Appellant reacted to the Respondent's submissions by, *inter alia*, filing amended sets of claims as new Main Request and 1st to 3rd Auxiliary Requests.

Claim 1 of this **Main Request** reads:

"*1. A composite material that comprises:*

(a) a support member made of polymeric material that has a plurality of pores extending through the support member, said pores having an average size between 0.1 and 25 µm, said support member has a volume porosity between 40 and 90%, and

(b) a macroporous cross-linked gel located in and filling the pores of the support member such that a liquid passing through the composite material must pass through the macroporous cross-linked gel, wherein said macroporous cross-linked gel is formed in the pores of the support member by reacting one or more monomers or cross-linkable polymers with a sufficient amount of one or more cross-linking agents such that said macroporous gel comprises regions of high polymer density defined by aggregation of the polymer and regions of essentially no polymer, defining macropores, wherein said macropores have an average size between 25 and

1500 nm, and wherein said macroporous gel has a volume porosity between 30 and 80%."

The further amended versions of claim 1 according to said 1st to 3rd Auxiliary Requests are also directed to such composite materials "*wherein said macroporous gel has a volume porosity between 30 and 80%*".

VIII. The Parties were summoned to oral proceedings.

IX. With letter dated 9 May 2016 (point 3), the Respondent extended its objections to the claims according to the new claim requests filed by the Appellant, *inter alia* the insufficiency objection regarding the MG-porosity feature.

X. With letter of 9 May 2016 the Appellant filed, *inter alia*, three sets of amended claims respectively labelled as 1st, 5th and 6th Auxiliary Requests, the previously pending 1st to 3rd requests of 22 January 2014 becoming the new 2nd to 4th Auxiliary Requests.

The respective versions of claim 1 according to each of the new Auxiliary Requests filed with said letter are also directed to such composite materials "*wherein said macroporous gel has a volume porosity between 30 and 80%*".

XI. At the oral proceedings held on 9 June 2016, the Respondent expressly dropped its objections against the admittance of the Appellant's Main and Auxiliary claim Requests into the proceedings.

During the debate on sufficiency in respect of the Appellant's Main Request, the Respondent *inter alia* reiterated the objection regarding the MG-Porosity

feature of claim 1. The Appellant replied by referring for the first time in the appeal proceedings to the method mentioned on page 18, last sentence, of the patent in suit. The subsequent discussion rendered evident the complexity of some technical issues apparently implied by this method. Both Parties agreed, therefore, that these issues could be more appropriately elaborated in written proceedings. The further course of the appeal proceedings was agreed upon and the Chairman announced, *inter alia*, that the proceedings would be continued in writing.

XII. The Parties were summoned to (second) oral proceedings. In a communication dated 15 June 2016, the Board *inter alia* summarised the agreed further course of the appeal proceedings and indicated the questions regarding sufficiency arisen at the (first) oral proceedings and still to be dealt with, as follows:

"The Appellant is herewith invited to file, within a time limit of two months, its arguments regarding the following questions that arose at said oral proceedings:

a) What is the meaning that the person skilled in the art reading the patent in suit will give to the expression "*macroporous gel*" as used in claim 1? In particular, does it correspond to a particular level of hydration?

b) How would the person skilled in the art reading the patent measure the "*volume porosity*" of the macroporous gel? Based on which elements of information contained in the patent and/or of common general knowledge?

After receipt of the Appellant's submissions, the

Respondent will be invited to file, also within two months, its observations in this respect.

This would leave time for the Parties to complement, if expedient, their submissions in this respect, before the date scheduled for the next oral proceedings."

XIII. The Appellant replied with letter of 11 August 2016.

The Respondent filed its observations with letter of 19 October 2016.

XIV. The (second) oral proceedings were held as scheduled on 13 December 2016.

XV. Final requests of the Parties

The Appellant requested that the decision under appeal be set aside and the patent be maintained in amended form on the basis of the claims according to the Main Request filed with letter of 22 January 2014, or, alternatively, on the basis of the claims according to the 1st Auxiliary Request filed with letter of 9 May 2016, one of the 2nd to 4th Auxiliary Requests, filed as 1st to 3rd Auxiliary Requests with letter of 22 January 2014, or one of the 5th and 6th Auxiliary Requests filed with letter of 9 May 2016.

The Respondent requested that the appeal be dismissed.

XVI. The relevant submissions of the **Appellant** can be summarised are resumed as follows.

At the first oral proceedings, the Appellant refuted the Respondent's objection that the patent would not teach how to determine the MG-Porosity, by arguing for

the first time in the appeal proceedings that the method for determining such parameter would be apparent to the person skilled in the art reading page 18, last sentence, of the patent in suit ("*The porosity of the membrane was estimated from the porosity of the support by subtracting the volume of the gel polymer*"). The Appellant argued that the "*volume of the gel polymer*" from which the MG-Porosity value could be determined according to this method, was the volume occupied exclusively by the gel polymer (i.e. without counting the volume of the macropores present within the gel) and that the practical implementation of this method would be self-evident to the person skilled in the art. In view of the subsequent debate at the hearing the Appellant however agreed with the Board that the Parties' submissions on this (new) line of argument should be more appropriately elaborated in writing.

In its letter of 11 August 2016 replying to the previous Board's communication identifying open questions on sufficiency) the Appellant

- stressing that the macroporous gel present in the patented composite material was a "*gel*" only when wet/swollen by the solvent, and

- describing the method to be used for determining the MG-Porosity of the composite material of the invention as implying, *inter alia*, the determination of the volume (that the Appellant now indicated as $\mathbf{V_{polymer}}$) exclusively occupied by the gel polymer, i.e. without counting the volume of the macropores present within the gel (i.e. in re-iteration of essentially the same line of reasoning already presented at the first oral proceedings

with reference to page 18, last sentence, of the patent);

- stated, *inter alia*, that such $V_{polymer}$ "refers to... the volume occupied by the polymer in the wet state" (see the first paragraph on page 6 of the letter), and

- described two alternative measuring methods (herein below **first method** and **second method**) for determining the $V_{polymer}$ that would be readily available to the person skilled in the art.

The first method for measuring the $V_{polymer}$ was described at point 2.3.2 of the letter of 11 August 2016. It implied the determination of the mass of the polymeric gel (herein below $\mathbf{M_{polymer}}$), as apparent from the passage reading:

"The volume of the gel without the volume of the macroporous gel's pores ($V_{polymer}$) cannot be directly measured in a composite material according to claim 1. However, the pores (void space) are 'weightless' (i.e. have no mass), such that the mass of the polymeric gel ($M_{polymer}$) is not influenced by the presence of pores. The mass of the gel, e.g., as portion of the composite material, is readily determined, for example by (i) weighing the support member before and after addition of the macroporous gel and (ii) by calculating the difference (which corresponds to the mass of the gel). The mass of the polymeric gel is applied to determine $V_{polymer}$ as follows...."

The **second method** for measuring the $V_{polymer}$ was described in the same letter in the footnote on page 7

comprising, *inter alia*, the following passage:

"... the porosity may also be determined ... by the straight-forward liquid displacement method ... For example, the composite material is immersed in a known volume of water (V_1). After saturation of the gel with water, the total volume (volume of water plus saturated composite material) is measured (V_2). After removal of the composite material from the water, the volume of the "remaining" water is measured (V_3). $V_2 - V_3$ gives the volume of the "solid fraction" of the composite material (sum of both, support and gel, without void volume), which the person skilled in the art easily uses to determine (i) the volume of the macroporous gel without pores ($V_{polymer}$)...".

At the second oral proceedings the Appellant additionally submitted, for the first time in the appeal proceedings, the following:

- As to the first measuring method it had presented in writing for the $V_{polymer}$, the Appellant ultimately conceded that in order to obtain a composite material in which the gel is in its wet/ swollen state (e.g. when forming the macroporous gel in the support member according to the synthetic method disclosed in paragraph [0102] of the patent in suit) the solvent (e.g. water) is also inevitably introduced into the macropores and, thus, these latter could not normally be presumed to be "weightless".

However, the Appellant alleged the following facts to be self-evident to the person skilled in the art:

- The solvent present in the macropores would be "loose" solvent that could easily be removed.

Hence, it was also self-evident to the person skilled in the art that when determining the $M_{polymer}$ "by (i) weighing the support member before and after addition of the macroporous gel and (ii) by calculating the difference" (as indicated in the above-cited passage of point 2.3.2 of the letter of 11 August 2016) it was possible to selectively remove the "loose" solvent only (i.e. without removing the solvent fraction wetting/swelling the polymer) prior to the second weighing.

- A measure suitable for selectively removing the "loose" solvent was explicitly mentioned in a passage of the patent in suit (paragraph [0102], last three lines) reading "*In order to determine the amount of gel formed in the support, the sample was dried in vacuum at room temperature to a constant mass. The mass gain due to gel incorporation was calculated as a ratio of an add on mass of the dry gel to the initial mass of the porous support*". Even in the hypothetical case that such mild drying method could surprisingly also remove the solvent wetting/swelling the polymer, the removal of such solvent present in the cross-linked gel phase would necessarily be much slower than that of the "loose" solvent. Hence, a person skilled in the art by simply monitoring the speed by which the solvent was removed under mild drying conditions, would be able to identify the moment in time at which all the "loose" solvent had been removed and, thus, to discontinue the drying before that substantial amounts of the solvent present in the gel phase were removed.

- Two other measures were also readily available for selectively removing said "loose" solvent. In

particular, this selective removal could be done by simply blowing air saturated with moisture through the support member. In the alternative, the "loose" solvent could simply be drained out by gravity.

- As to the second measuring, the Appellant conceded that after the "saturation" with water, the macropores would necessarily be filled with water and that the simple removal of the composite material from the water would not necessarily cause this "loose" water to drop out. It argued however, by making reference to the same allegedly self-evident facts on the measures apt at selectively removing the "loose" solvent already mentioned *supra*, that the person skilled in the art would know how to ensure that the entire "loose" water became part of the "remaining" water (i.e. of the volume V_3), so that the difference "$V_2 - V_3$" allowed to determine the searched volume of the "solid fraction" (intended as the sum of the volume occupied by the solid support and of the $V_{polymer}$).

Thus,the person skilled in the art reading the last sentence on page 18 of the patent in suit could readily determine the $V_{polymer}$ and, therefrom, the MG-Porosity of composite materials as claimed. Hence, the invention as defined in claim 1 according to any of the pending Main and Auxiliary Requests was sufficiently disclosed also in respect of this last feature.

XVII. The relevant submissions of the **Respondent** can be summarised as follows.

The MG-Porosity was a mandatory feature of the invention as defined in the respective amended claims 1 of all pending requests of the Appellant. Since, as

also explicitly indicated in paragraph [0027] of the patent suit, there was no simple way to accurately predict the porosity characteristics the macroporous gel, the claimed materials could only be reproduced provided the person skilled in the art reading the patent in suit would learn therefrom how to measure, *inter alia*, the MG-Porosity.

The reply (see point "e)" on page 10) to the statement of grounds of appeal, contained some reasons clearly intended to rebut the finding of the Opposition Division (reason 5.2 of the appealed decision) that the MG-Porosity could be determined by means of the formula for the "Mass Gain" given in paragraph [0236] of the patent in suit.

Moreover, in its letter of 19 October 2016 the Respondent commented on the Appellant's written submission of 11 August 2016 and disputed that the first method for measuring the $V_{polymer}$ suggested by the Appellant was suitable for this purpose. In particular, from the line of reasoning on page 6 (third to fifth paragraph) of the Respondent's letter, it was apparent that the Appellant's explicit allegation that the macropores could be considered to be "weightless" had been contested.

The Respondent stressed that "in order to keep the macro-porous gel in the fully swollen/wet state, the solvent has to remain inside the pores of the macro-porous gel", i.e. the macropores surrounded by the wet/swollen polymer gel would normally be filled with solvent. However, the method suggested by the Appellant was only applicable if "the mass of the macro-porous gel could be determined with the pores in an empty state". Hence the suggested method was not applicable.

At the second oral proceedings the Respondent added that the inevitable presence of the water also in the macropores of the composite materials "saturated" with water, rendered inapplicable also the second method for measuring the $V_{polymer}$. Indeed, the described simple "removal" of the soaked composite material from the water manifestly failed to ensure that the all water comprised in the macropores was actually drained therefrom (by dropping out).

The explanations and assertions submitted by the Appellant regarding measures supposedly apt to selectively and completely remove the "loose" solvent from the macropores were based on allegations that were unsupported and not plausible.

- In particular, the Appellant's unsupported allegation that the fraction of solvent filling the macropores would be regarded by the person skilled in the art as "loose" solvent and thus be substantially easier to remove than the fraction of solvent wetting/swelling the polymer was disputed.

- There was also no reason for the person skilled in the art reading the last three lines of paragraph [0102] of the patent in suit to identify the drying step mentioned in this passage as a measure suitable for selectively removing the "loose" solvent while leaving the gel polymer in its wet/ swollen state. On the contrary, the Respondent alleged that, in the absence of any further information, the mention in [0102] that a "*dry gel*" resulted from such drying step, would rather appear to indicate that this step removed all or almost all the solvent (i.e. including solvent wetting/ swelling the polymer).

- There would also be no reason for expecting that during such drying step the solvent filling the macropores would be removed at a much faster rate than the solvent wetting/swelling the polymer (and, thus, no reason rendering plausible a sudden drop in the speed by which the solvent is collected, as alleged by the Appellant).

- Neither the blowing of the material with moistened air nor the use of gravity (none of which was mentioned or implied in the patent in suit) appeared to be clearly apt to selectively remove only the (allegedly "loose") solvent contained in the macropores of the composite material. This would be evident when considering the very complex structure of the claimed composite material. For instance, removing the solvent from a tortuous macropore possibly having a dead end could be predicted to require more than the simple action of gravity or gas blowing. Moreover, it was not sufficient to use air saturated with moisture to prevent that the water present (as solvent) at the boundaries of the macropores might be drained out in its liquid state by the air blow, or drained out as vapour because its vapour tension was superior to that of the pure liquid water used to saturate the air used for blowing with moisture.

In any case, the Board should not allow the Appellant to rely on unsupported assertions of a technical nature only presented at the second oral proceedings, i.e. submitted orally at the very last stage of the proceedings despite of the explicit request in the communication issued by the Board that the Parties' submissions as to the method for measuring MG-Porosity were to be provided in writing prior to the hearing.

If admitted into the proceedings, more time would be needed in order to properly consider the new complex technical issues arising from the Appellant's new submissions.

Taking all this into account, the new submissions of the Appellant presented orally for the first time at the second oral proceedings should be disregarded by the Board.

Disregarding these submissions, it had not been convincingly shown that the person skilled in the art was able to prepare composite materials having the MG-Porosity required according to claim 1 (all requests).

Thus, the appeal should be dismissed.

Reasons for the Decision

Procedural issues

1. Admittance of the Appellant's claim Requests

1.1 Already at the hearing of 9 June 2016 the Respondent had stated that it no longer objected to the admittance of any of the (currently still pending) amended claim requests of the Appellant into the appeal proceedings.

1.2 Hence, in the exercise of its discretion under Article 13(1) RPBA the Board decided to admit this request into the proceedings.

2. Non-admittance of the amendments to the Appellants case

2.1 At the second oral proceedings on 13 December 2016, the Appellant submitted for the first time technical arguments supposed to provide explanations as to how the persons skilled in the art could and would actually carry out the two methods for measuring the $V_{polymer}$ described in the letter of 11 August 2016. In particular, it conceded that the measurement in question necessarily required the selective removal of the (allegedly "loose") solvent present in the macropores. It also referred to a number of alleged facts as to measures permitting such selective removal (see XVI, supra).

2.2 The Respondent disputed not only the substance of these new submissions, but also emphasised that they had been presented for the first time only at the second oral proceedings, i.e. submitted at the latest stage of the proceedings, and this despite the adjournment of the first oral proceedings intended to permit the Parties to present their full technical argumentation in writing prior to the second oral proceedings. The Appellant had thus not complied with the explicit indications to this end contained in the Board's communication. Finally, since the unjustifiably late presentation of additional explanations by the Appellant raised a number of further complex issues, and the Respondent needed more time in order to properly consider them.

Thus, the Respondent requested that these submissions be disregarded by the Board.

2.3 As regards this request of the Respondent, the Board took into account the following aspects of the case:

2.3.1 At least upon reading the Respondent's reply of 19 October 2016, the Appellant had to be aware of the fact that the Appellant's letter of 11 August 2016 did not provide all the information required for considering the described methods to be applicable in measuring the $V_{polymer}$ value. Indeed, the nature of the missing information was evident considering the explicit objections in the Respondent's letter of 19 October 2016 (page 6, third to fifth paragraphs; summarised under XVII, *supra*) that the first method for measuring the $V_{polymer}$ described by the Appellant in the letter of 11 August 2016 implied the determination of the mass of the macroporous gel in the wet/swollen state, but with the macropores "in an empty state". Hence, it was not applicable to the composite materials of the invention because in order to keep the macroporous gel present therein in the required wet/ swollen state, "the solvent has to remain inside the pores of the macro-porous gel".

2.3.2 Moreover, the Appellant, in seeking to rebut this objection of the Respondent based on the additional technical arguments submitted for the first time at the second oral proceedings, implicitly acknowledged that the Appellant's written answer of 11 August 2016 to the Board's question "b)" (see XII, *supra*) was incomplete at least as regards the way for selectively removing the solvent inevitably present in the macropores and, thus, as regards the measuring of the $V_{polymer}$ value.

2.3.3 Furthermore, the explicit indication in the Board's communication of 15 June 2016 (point 3) that the period between the filing of Respondent's observations and the date scheduled for the second oral proceedings had expressly been foreseen to give "time for the Parties to complement, if expedient, their submissions".

Nevertheless, the Appellant, aware that its preceding written submissions as to the method for measuring the $V_{polymer}$ were incomplete, only sought to complete its submissions in this respect on the day of the (second) oral proceedings.

2.3.4 Due to this behaviour of the Appellant, the adverse party and the Board were confronted (again) with new technical arguments and statements at (the second) oral proceedings. As apparent from the assertions of both Parties regarding the the substance of these new submissions (see XVI and XVII, *supra*), complex issues arose, on which the Respondent took position mostly by also making assertions, unsupported by evidence, contradicting those made by the Appellant.

Therefore, the Board accepts the Respondent's assertion that it was not in a position to properly deal with these complex new issues only raised at the oral proceedings.

2.4 Considering the above circumstances the Board, in the exercise of its discretion under Article 114(2) EPC and Article 13(3) RPBA, decided to disregard the technical arguments of the Appellant submitted for the first time during the oral proceedings of 13 December 2016, essentially because they were not submitted in due time (Article 114(2) EPC) and because they raised issues which the Respondent could not be expected to deal with without an adjournment of the oral proceedings (Article 13(3) RPBA).

Main Request - Insufficiency of the disclosure

3. Implications of the MG-Porosity feature of claim 1

3.1 Claim 1 of the Main Request (see Section VII, *supra*) requires the macroporous cross-linked gel present in the pores of the support member to possess a MG-Porosity value within the specified range.

3.1.1 The Board holds that paragraph [0027] of the patent in suit (see the initial passage therein reading "*There is no simple way to predict accurately the structure parameters of porous gels obtained under given conditions, but qualitative rules are available to give some guidance.*") implicitly confirms that it is not possible to give precise technical instructions, e.g. as to how to identify an appropriate mixture of reagents, allowing to produce, without undue experimental burden, macroporous gels inevitably possessing the required MG-Porosity.

3.1.2 No measured values for the MG-Porosity are given for the macroporous gels exemplified in the patent in suit, nor does the description of these examples comprise any express or implicit indication that their MG-Porosity values had actually been measured in some way, let alone found to be in the required range of 30 to 80%.

3.2 The Board thus concludes that the requirement of Article 83 can only considered to be met provided the person skilled in the art seeking to carry out the claimed invention is able to determine the MG-Porosity of the composite materials prepared by following the relevant technical teaching of the patent in suit (as given in e.g. paragraphs [0027] and [0102]).
This is not in dispute.

4. The reasons given in the decision under appeal

4.1 In the decision under appeal (Reasons, 5.2), the Opposition Division acknowledges sufficiency of the disclosure as regards determination of the MG-Porosity, referring in particular to the preparation procedure described in paragraph [0102] and to the formula disclosed in paragraph [0236], i.e.

$$\text{Mass Gain (\%)} = \frac{\varphi/v_2}{(1-\varepsilon)\rho} \times 100\%$$

In this equation the "*Mass Gain*" of a composite material containing macroporous polymer gel within the pores of the support is expressed in terms of *inter alia* the "*fraction φ*" of the pores of the support occupied by the polymer of the gel, and the porosity of the support.

4.1.1 The Board, however, does not find these reasons convincing, if only because it is not apparent how paragraphs [0102] and [0236] where the MG-Porosity is not even mentioned, let alone in connection with the given formula, could possibly imply sufficient information as to how to determine the MG-Porosity within the meaning of the patent.

4.1.2 This is all the more evident when considering the lack of clarity of the definition of the "*fraction φ*" in paragraph [0236] if applied to a composite material as claimed. It is, for instance, not clear whether or not the fraction of the volume of the pores in the support occupied by the gel polymer is supposed to include the volume occupied by the solvent filling the macropores in the gel.

4.1.3 Since the Appellant did not rely on said equation in its submissions, further details need not to be given in this respect.

5. The submissions made by the Appellant in the course of the appeal proceedings are essentially supposed to demonstrate that the method for determining the MG-Porosity is the one described in general terms on page 18 (last sentence) of the patent in suit: "*The porosity of the membrane was estimated from the porosity of the support by substracting the volumen of the gel polymer.*" According to the Appellant, the practical implementation thereof would be self-evident to the person skilled in the art.

5.1.1 In particular, from the Appellant's whole line of reasoning (summarised under XVI, *supra*) it is apparent to the Board that the Appellant's interpretation of the wording "*volume of the gel polymer*" in the quoted sentence is to be equated to the definition of $V_{polymer}$ given in the Appellant's letter of 11 August 2016, namely that this is supposed to designate the volume occupied by the polymer gel in its wet/swollen state but without the volume of the macropores in the gel.

5.1.2 Accordingly, the reasoning of the Appellant implies, *inter alia,* that the determination of the MG-Porosity requires the determination of the $V_{polymer}$ value by one of the two measuring methods described in the letter of 11 August 2016 (see XVI, *supra*).

5.2 As regards the first method for measuring $V_{polymer}$

5.2.1 As convincingly argued by the Respondent in its letter of 19 October 2016 (see page 6, third to fifth paragraphs) and not disputed by the Appellant

- the first of these two methods for measuring the $V_{polymer}$ is expressly based on the assumption that the macropores are "weightless",

- whereas the claimed composite materials according to the invention, comprising the macroporous gel in its wet/swollen state (e.g. those obtainable by the preparation process described in paragraph [0102] of the patent in suit, after the final washing steps) will also inevitably contain solvent filling their macropores.

5.2.2 Hence, the first method can only be applied for determining the $V_{polymer}$ if the person skilled in the art also knows how to selectively remove only the solvent filling the macropores from the composite materials.

5.2.3 Without any further explanations in the letter of 11 August 2016, and absent any evidence of common general knowledge in this respect, the Board is not convinced that the person skilled in the art would actually find it self-evident how to selectively remove the solvent from the macropores without also removing the solvent merely wetting/swelling the gel.

5.2.4 The Board concludes that the additional submissions presented by the Appellant in this letter as to the first measuring method are not sufficient to establish that the person skilled in the art was able to determine the $V_{polymer}$ value without any undue burden.

5.3 As regards the second method for measuring $V_{polymer}$

5.3.1 In respect of second method described in the footnote on page 7 of the letter of 11 August 2016, the

Appellant ultimately conceded that in this second method the step of "saturation" with water of the composite material will necessarily also fill with water the macropores present therein.

5.3.2 Thus, the described "removal of the composite material from the water" does not appear (and is not disclosed) to be *per se* sufficient to guarantee that the water filling the macropores (since the beginning or having penetrated during "saturation") is entirely removed from the macropores by merely dropping out due to gravity. Ultimately, this remained undisputed by the Appellant.

5.3.3 Hence, the difference "V_2-V_3", rather than corresponding to the volume of the "solid fraction" (i.e. the "sum of both support and gel, without void volume", as stated in said footnote), represents the sum of this latter volume and of the volume of the water (remaining) in the macropores.

5.3.4 Hence, also the second method, readily available to the person skilled in the art according to the Appellant, can only be used for determining the $V_{polymer}$ value provided the person skilled in the art knows how to selectively remove the water filling the macropores without also removing the solvent merely wetting/ swelling the gel (and, thus, can measure the volume of the water removed from the macropores, and add it to the volume V_3 of the "remaining" water).

5.3.5 However, without any further explanations in the letter of 11 August 2016, and absent any evidence of common general knowledge in this respect, the Board is not convinced that the person skilled in the art would actually find it self-evident how to selectively remove

the solvent from the macropores without also removing the solvent merely wetting/swelling the gel.

5.3.6 The Board concludes that also the additional submissions presented by the Appellant in this letter as to the second measuring method are not sufficient to establish that the person skilled in the art was able to determine the $V_{polymer}$ value without any undue burden.

6. If only for the reasons set out above, the Appellant did not render plausible that the person skilled in the art reading the patent in suit would be able to assess the occurrence the MG-Porosity feature in a given composite material meeting the other requirements of claim 1 at issue.

7. Accordingly, the Board comes to the conclusion that the patent in suit does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

8. Accordingly, the Appellant's Main Request is not allowable.

Appellant's Auxiliary Requests - Insufficiency of the disclosure

9. All other versions of claim 1 as amended according to each of the pending 1st to 6th Auxiliary Requests (regarding their wordings, see VII and X, *supra*) also require the macroporous cross-linked gel to have the MG-Porosity feature, i.e. "*a volume porosity between 30 and 80%.*"

9.1 The further amendments made to the respective claims 1 of the Auxiliary Requests have no bearing on the meaning to be given to this feature. Absent any argument to the contrary, the Board thus holds that the reasoning given as regards the insufficiency caused by said feature as comprised in claim 1 of the Main Request applies *mutatis mutandis* to the respective independent claims 1 of all pending Auxiliary Requests. This was also conceded by the Appellant at the oral proceedings.

9.2 Since all the pending Auxiliary Requests are thus also objectionable under Article 83 EPC, none of them is allowable either.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar: The Chairman:

D. Magliano B. Czech

Decision electronically authenticated