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**D E C I S I O N**  
**of 23 May 2000**

**Case Number:** T 0141/98 - 3.3.6

**Application Number:** 94303133.6

**Publication Number:** 0681053

**IPC:** D06M 14/10

**Language of the proceedings:** EN

**Title of invention:**

Carboxyl group-modified cellulose or acryl fiber and process  
of producing same

**Applicant:**

NIPPON SANMO SENSYOKU CO., LTD.

**Opponent:**

-

**Headword:**

Modified fibre/SANMO SENSYOKU

**Relevant legal provisions:**

EPC Art. 54(1), (2), 56, 123(2)

**Keyword:**

"Inventive step (yes) - repeated use (invention) vs single use  
(prior art)"

**Decisions cited:**

T 0153/84

**Catchword:**

-



**Case Number:** T 0141/98 - 3.3.6

**D E C I S I O N**  
**of the Technical Board of Appeal 3.3.6**  
**of 23 May 2000**

**Appellant:** NIPPON SANMO SENSYOKU CO., LTD.  
35, Butai-cho  
Fushimi-ku  
Kyoto-shi  
Kyoto (JP)

**Representative:** Allam, Peter Clerk  
LLOYD WISE, TREGEAR & CO.  
Commonwealth House  
1-19 New Oxford Street  
London WC1A 1LW (GB)

**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 25 August 1997  
refusing European patent application  
No. 94 303 133.6 pursuant to Article 97(1) EPC.

**Composition of the Board:**

**Chairman:** P. Krasa  
**Members:** G. N. C. Raths  
C. Rennie-Smith

## Summary of Facts and Submissions

I. This appeal lies from the Examining Division's decision refusing the European patent application No. 94 303 133.6 (publication No. 0 681 053), which related to carboxyl group-modified cellulose or acryl fibre and process of producing same, on the grounds that the subject-matter of the then pending Claim 1 was not new and the subject-matter of Claim 6 lacked an inventive step in view of documents

(1) EP-A-0 262 405, and

(2) Textile Research Journal, 1989 (59), 525 to 529 .

II. The Appellant (Applicant) had filed an amended set of 11 claims of which Claims 1 to 6 were filed with a letter of 27 January 2000 and claims 7 to 11 with a letter of 12 April 1996. Claims 1 and 6 read as follows:

"1. A modified fiber comprising an acrylonitrile-series substrate fiber and a graft comonomer graft-copolymerized to said substrate fiber in an amount of 3-60% by weight based on the weight of said substrate fiber, said graft comonomer being at least one member selected from the group consisting of methacrylic acid and hydroxyalkyl methacrylate."

"6. A process for the production of a modified fiber as defined in Claim 1 comprising graft-copolymerizing a graft comonomer to an acrylonitrile-series substrate fiber in an aqueous medium containing hydrogen peroxide and a source of ferrous ion, said graft comonomer being at least one member selected from methacrylic acid and

hydroxyalkyl methacrylates."

Claims 2 to 5 depending on Claim 1 specified the fiber, the vinyl comonomer, the amount of the acrylonitrile content of the copolymer and the hydroxyalkyl methacrylate, respectively.

Claims 7 to 11 depending on Claim 6 specified the ferrous ion source, the ferrous salt, the amounts of ferrous salt and hydrogen peroxide, the amount of the graft comonomer and of the aqueous medium, and the graft copolymerization conditions, respectively.

III. In the statement of the grounds of appeal, the Appellant argued in essence that document (1) did not disclose a modified acrylonitrile fibre having a graft comonomer grafted thereto; according to it, the difference lay in the type of bonding between the polymer and the fibre; in the case of the modified fibre according to document (1), this bonding was of a physical nature and, in the case of the modified fibre according to the application in suit, of a chemical nature.

The Appellant also filed evidence in order to prove the difference between the composite obtained according to the process of document (1) and the composite of the application in suit.

IV. In its letter of 12 January 2000 the Appellant requested the Board either

(a) to remit the application to the Examining Division with an order to grant a European patent on the basis of the European specification as it

currently stood (main request); or alternatively

- (b) to decide that the current claims meet the requirements of Articles 52 to 56 EPC, and to remit the case to the Examining Division for the substantive examination to continue (auxiliary request).

The Appellant also requested oral proceedings in case the Board was not inclined to allow the above requests.

Further, the Appellant requested reimbursement of the appeal fee but in the event one of its other requests should be allowed without oral proceedings, asked the Board to decide on this request also without such proceedings.

## **Reasons for the Decision**

### 1. *Main request*

#### 1.1 Article 123(2) EPC

Claims 1 and 6 differ in essence from Claims 1 and 6 as originally filed in that cellulose fibres are no longer mentioned as possible substrate fibres.

The Board is satisfied that these amendments - whereby an alternative clearly defined in the application as filed was deleted - do not contravene Article 123(2) EPC which was not an issue during the examination procedure.

1.2 Novelty

1.2.1 Modified fibre according to Claim 1

Claim 1 of the application in suit is directed to a modified fibre comprising an acrylonitrile fibre substrate, and a graft comonomer graft-copolymerized to said substrate fibre (hereafter referred to as the "composite of Claim 1"). In assessing novelty, the question was whether the modified acrylonitrile fibre of document (1) had a graft monomer grafted thereto or not.

In order to prove the difference between the subject-matter disclosed in document (1) and that in the application in suit, the Appellant submitted experimental data. It immersed an acrylonitrile fibre in an aqueous solution containing hydrogen peroxide and a source of ferrous ion, thus following the procedure disclosed in the application in suit; the surface of the fibre was impregnated with a methacrylic monomer solution which polymerized; it also reproduced example 5 of document (1), which comprised a polyester fibre, on which the Examining Division relied in its decision. In further experiments, the polyester fibre of document (1) was replaced by a polyacrylonitrile fibre. On the one hand, the surface of the **polyester** fibre was impregnated with an acrylic monomer solution which polymerized, on the other hand, the surface of the **polyacrylonitrile** fibre with acrylic acid respectively with a mixture of acrylic acid and methacrylic acid in a ratio of 1:1. The prior art composite comprising the polyester fibre and the polyacrylonitrile fibre as well as the composite of Claim 1 comprising the

polyacrylonitrile fibre were submitted to a wash treatment; in the case of the prior art samples, the polyacrylic polymer was removed by the washing step from the polyester or polyacrylonitrile fibre substrate; in the case of the invention sample, the polymethacrylic polymer was not washed out.

In particular, the difference of weight loss on washing, which was considerable in the case of the prior art product (page 4 of the annex to the Appellant's letter of 15 December 1997, point 2.2, experiment 4, table) and extremely low in the case of the invention product (page 5 of said annex, point 2.5, comparative experiment) proves that according to the process of document (1), no grafting of the graft comonomer on a fibre but only a physical bonding of the polymer to the fibre took place.

Therefore, the Board concludes that the subject-matter of Claim 1 and of dependent claims 2 to 5 is not anticipated by document (1); further, the Board is satisfied that document (2) does not disclose the subject-matter of Claims 1 to 5. It follows that the subject-matter of Claims 1 to 5 is new.

#### 1.2.2 Process according to Claim 6

The subject-matter of Claim 6 is directed to a graft-polymerizing process utilising an aqueous medium containing hydrogen peroxide and a source of ferrous ion.

Document (1) does not disclose a source of ferrous ion and, therefore, does not anticipate the subject-matter of Claim 6 and of dependent claims 7 to 11.

Document (2) does not relate to graft-polymerizing to an acrylonitrile series substrate and, therefore, does not disclose the subject-matter of Claims 6 to 11 either. It follows that the subject-matter of Claims 6 to 11 is new.

1.3 Inventive step

1.3.1 Modified fibre according to Claim 1

1.3.1.1 The application was concerned with a carboxyl group-modified acryl fibre and a process of producing same.

Water absorptive composites comprising an acrylic polymer on a fibrous substrate and a process for preparing same were known from document (1), which is the appropriate starting point for evaluating inventive step.

1.3.1.2 Document (1) discloses a process for preparing a water absorptive composite material in which a highly water absorptive polymer is held on a prefabricated substrate, comprising applying an aqueous solution of an acrylic acid type monomer to a prefabricated fibrous substrate, polymerizing the acrylic acid type monomer to obtain a precursor of the composite which is further subjected to crosslinking (page 2, lines 6 to 11).

1.3.1.3 According to the application in suit, the technical problem to be solved was to impart hydrophilicity to acrylonitrile fibres.

According to examples 1 to 6 (examples 4 to 9 as originally filed) of the application in suit, a



certain graft degree was obtained. The comparative data submitted with a letter of 15 December 1997 prove that graft copolymerized acrylonitrile fibres according to the invention withstood repeated washing.

Now, with respect to the data on file, the problem underlying the application in suit with respect to document (1) was to improve the hydrophilicity property of the water absorptive polymer in such a way that this property was maintained even after repeated washing.

- 1.3.1.4 In view of the data submitted in the Appellant's letter of 15 December 1997, the Board is satisfied that the problem underlying the present invention was solved by the modified fibre suggested in Claim 1.
- 1.3.1.5 The question remains whether the modified fibre according to Claim 1 involves an inventive step.
- 1.3.1.6 The composite of Claim 1 is distinguished from the composite of document (1) in that, in the latter, the bonding of the acrylic acid polymer to the substrate was of a physical nature whereas it was of a chemical nature in the application in suit. The Board accepts that, according to the comparative data on file (points 2.2 to 2.5 of the letter of 15 December 1997), grafting between the polymer and the substrate took place.

The effect of this grafting process was to allow the possibility of repeated use of the water absorptive composite.

The different use illustrates the difference in the

properties of the respective products: whereas disposable diapers and sanitary napkins are made of the composite disclosed in document (1) (page 2, line 17), i.e. the objective is a single use, the composite of Claim 1 effectively absorbs metal ions and basic and unpleasant odour substances such as ammonia and amines (column 4, lines 2 to 4), and is to be used in the manufacture of textiles (point 3.4, last sentence, annex to the Appellant's letter of 15 December 1997), i.e. the objective is a repeated use of the claimed modified fibre retaining its properties after repeated washing.

The solution of Claim 1 of the application in suit is not foreshadowed in document (1) which contains no information how to modify the disclosed composite material and the process for its manufacture to arrive at a product suitable for repeated use.

1.3.1.7 Nor does document (2) contain any indication to the skilled person how to solve the present technical problem. Whereas document (2) is directed to graft copolymerization of methyl methacrylate onto jute fibres applying Fenton's reagent ( $\text{Fe}^{2+}$ -  $\text{H}_2\text{O}_2$ )- which was said to be efficacious in grafting vinyl monomers onto cellulose, starch and wool fibres (right column, paragraph 2, lines 1 to 5), all of which substrates are chemically different from acrylonitrile - it did not address the problem of imparting hydrophilicity. The Board, therefore, concludes that a skilled person would not have turned to document (2) when looking for a solution to the above defined technical problem.

1.3.2 It follows that the subject-matter of Claim 1 involves an inventive step over documents (1) and (2), either

alone or in combination with each other.

1.3.3 Claim 6 relates to the manufacture of the product of Claim 1. It is based on the same technical concept - which is inventive with respect to citations (1) and (2) - as are the dependent Claims 2 to 5 and 7 to 11, relating to specific embodiments of the subject-matter of Claims 1 and 6, respectively.

1.3.4 Apart from citations (1) and (2), the documents cited in the Search report have not yet been considered by the Examining Division. Nor have they been considered by the Board, which is only concerned with the review of decisions under appeal and not with the examination of matters outside the framework of the appeal proceedings.

Therefore, the application in suit is, at present, not ready to proceed to grant.

For this reason, the main request is, therefore, not allowable.

2. *Auxiliary request*

According to the reasoning under point 1, Claims 1 to 6 filed with letter of 27 January 2000 and Claims 7 to 11 filed with letter of 12 April 1996 meet the requirements of Article 52(1), 54 and 56 EPC as far as documents (1) and (2) are concerned; the auxiliary request, to remit the case to the Examining Division for the substantive examination to continue, is, therefore, allowable.

3. *Reimbursement of the appeal fee*

The Appellant requested reimbursement of the appeal fee in the event that his request for interlocutory revision under Article 109 EPC was not granted. The Examining Division decided that the appealed decision should not to be rectified.

In this case, the Board of Appeal came to a different conclusion than the Examining Division which, at the date of refusal of the application, did not have at its disposal the comparative data filed with the letter of 15 December 1997 which allowed the Board of Appeal to interpret document (1) in a different way. That the Board did not concur either with the Examining Division's evaluation of document (1) or, consequently, with its assessment of patentability of the then pending claims does not amount to a procedural violation and cannot lead to a reimbursement of the appeal fee (see T 153/84).

Therefore, the Board of Appeal decides that the appeal fee is not to be reimbursed.

Under these circumstances it was not necessary to summon the Appellant to attend oral proceedings.

## Order

### For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The case is remitted to the Examining Division with the order for further prosecution of the application on the basis of

**Claims:** 1 to 6 filed with the letter of 27 January 2000,  
7 to 11 filed with the letter of 12 April 1996.

The Registrar:

The Chairman:

S. Hue

P. Krasa