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Datasheet for the decision of 24 May 2018

Case Number: T 0447/15 - 3.3.03

Application Number: 01924646.1

Publication Number: 1297039

IPC: C08F265/10, C08J3/24

Language of the proceedings: EN

Title of invention:
STRUCTURALLY-MODIFIED POLYMER FLOCCULANTS

Patent Proprietor:
Ondeo Nalco Company

Opponents:
BASF SE
Akzo Nobel Chemicals International B.V.

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
Novelty - (yes- structure of polymers not shown to be identical to those of prior art)
Inventive step - (no) (all requests)

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Case Number: T 0447/15 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 24 May 2018

Appellant: (Opponent 2)	Akzo Nobel Chemicals International B.V. Stationsstraat 77 3811 MH Amersfoort (NL)
Representative:	Berggren Oy, Turku P.O. Box 99 Tykistökatu 2-4 B 20521 Turku (FI)
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Party as of right: (Opponent 1)	BASF SE 67056 Ludwigshafen (DE)
Representative:	Peatfield, Jeremy William BASF Performance Products plc Patent Department PO Box 38 Cleckheaton Road Low Moor Bradford, West Yorkshire BD12 0JZ (GB)
Decision under appeal:	**Interlocutory decision of the Opposition Division of the European Patent Office posted on 8 January 2015 concerning maintenance of the European Patent No. 1297039 in amended form.**

Composition of the Board:

Chairman	D. Marquis
Members:	M. C. Gordon
	C. Brandt

Summary of Facts and Submissions

I. The appeal lies against the interlocutory decision of the opposition division posted on 8 January 2015 according to which it was held that European Patent number 1 297 039 could be maintained in amended form on the basis of the first auxiliary request filed on 25 May 2013.

II. The patent was granted with a set of 8 claims, whereby claims 1 and 8 were independent and read as follows:

"1. A structurally-modified nonionic, cationic or anionic water-soluble polymer, the polymer comprising a mixture of linear polymer and long-chain branched polymer, said polymer mixture having a reduced specific viscosity above 3 dl/g, wherein the polymer is prepared by initiating polymerization of an aqueous solution of monomers under free radical polymerization conditions to form a polymer solution and adding at least one structural modifier to the polymer solution after at least 30% polymerization of the monomers has occurred.

8. A method of preparing a structurally-modified nonionic, cationic or anionic water-soluble polymer, the polymer comprising a mixture of linear polymer and long-chain branched polymer, said polymer mixture having a reduced specific viscosity above 3 dU/g [*sic*], comprising initiating polymerization of an aqueous solution of monomers under free radical polymerization conditions to form a polymer solution and adding at least one structural modifier to the polymer solution after at least 30% polymerization of the monomers has occurred."

III. Two notices of opposition against the patent were filed in which revocation of the patent on the grounds of Article 100(a) EPC (lack of novelty, lack of inventive step), Article 100(b) and Article 100(c) was requested.

The following documents, *inter alia* were cited in support of the oppositions:

D5: WO-A-99/40147
D6: EP-A-264 710.

IV. The decision was based on the claims of the patent as granted as main request and an amended set of four claims as first auxiliary request.

In the auxiliary request, claim 1 differed from claim 1 of the patent as granted in that the linear polymer was defined as:
"linear **high molecular weight** polymer" (Board's emphasis)

and in that the following wording was introduced at the end:

", wherein the structural modifier is a cross-linking agent."

Analogously claim 4 of the auxiliary request differed from claim 8 as granted in the amended definition of the linear polymer and the insertion of the indicated wording at the end of the claim.

According to the decision, the main request (patent as granted) did not meet the requirements of Article 123(2) EPC. The details of the reasons for this conclusion are not of relevance to the present

decision.

The first auxiliary request met the requirements of sufficiency of disclosure, which finding has not been challenged by the appellant. Clarity was provided by the definition of the product-by-process features, inherent unclarities of terms such as "high" and "long" notwithstanding. With respect to novelty, the documents cited did not disclose all features of claims 1 and 4, emphasis for this conclusion being placed on the process features, which were held to result in different products. The requirements of inventive step were found to be satisfied, reliance again being placed on the process features also in respect of the product claim. Regarding a proposed combination of the documents D5 and D6 it was held that their teachings were incompatible.

V. The Appellant/Opponent II (Akzo Nobel Chemicals International B.V.) filed an appeal against the decision, invoking the grounds of Article 84 EPC in respect of amendments made during the opposition procedure, novelty and inventive step. A further written submission was made with date of 20 April 2018.

VI. The respondent/patent proprietor replied to the appeal. With the reply an auxiliary request, consisting of a single claim corresponding to claim 4 of the main request, was submitted.

Further submissions were made with letters of 24 April 2018 and 17 May 2018.

With the latter submission, filed a week before the oral proceedings, a set of claims as first auxiliary request was submitted, the previously submitted

auxiliary request being redesignated second auxiliary request.

Claim 1 of the new first auxiliary request differed from the main request by specifying that the polymer was:
"selected from the group consisting of emulsion polymers, dispersion polymers and gel polymers".

VII. Opponent I - BASF SE - did not make any submissions in the appeal proceedings beyond indicating with letter of 23 April 2018 that it would not attend the oral proceedings.

VIII. The Board issued a summons to oral proceedings and a communication.

IX. Oral proceedings took place on 24 May 2018, in the absence of Opponent I as duly announced.

X. The arguments of the appellant, insofar as relevant to the decision can be summarised as follows.

(a) Main request

D5 disclosed a composition prepared by combining two separately prepared polymer emulsions, one crosslinked, the other linear.
Once combined, there would be an exchange of polymers between the emulsion droplets, meaning that the resulting composition would be indistinguishable from that according to claim 1.
There was no evidence that there were any measurable properties which would allow reliably to distinguish the claimed system from that of D5.

Even accepting that novelty were to be acknowledged, the claimed subject-matter lacked inventive step. There was no evidence of an effect associated with the claimed polymers. At most the claim might be directed to alternatives to the polymers known from D5. However D5 itself speculated that the polymers could be prepared in a single mixture. D6 disclosed such a process involving addition of crosslinker after a certain extent of reaction, and reported that this resulted in products having a mixture of linear and crosslinked polymers as required by the operative claim. The point in time at which crosslinker was added, as defined in the "product by process" aspect of the operative claims, had not been shown to be associated with any effect and therefore was to be seen as arbitrary.

This objection applied to both independent claims.

(b) First auxiliary request

This request had been filed very late and therefore should not be admitted. Furthermore claim 4 was identical to that of the main request meaning that the same objections applied.
The amendments made to claim 1 did not result in any (further) distinction over the disclosure of D5 since example 12 thereof related to emulsion polymers, therefore precisely the same objections in respect of inventive step arose as for the main request.

(c) Second auxiliary request

No further arguments were advanced.

XI. The arguments of the respondent can be summarised as follows:

(a) Main request

The fact that it was not possible to identify specific structural or other features of the subject-matter claimed which distinguished it from the product of D5 example 12 did not mean that novelty was to be denied. Consideration of the preparation methods showed clearly that the product as claimed was necessarily different to that of D5. In particular there was no evidence to support the argument of the appellant that once combined, there would be exchange of polymers between the two emulsions of D5. On the contrary D5 indicated that such exchange would not occur. Furthermore the addition of crosslinker to an active polymerising system already containing linear polymer would necessarily result in a different - more entangled - structure as set out in paragraph [0069] of the patent than would be obtained in the process of D5.

Regarding inventive step, the technical problem could be seen as the provision of an alternative mixture of polymers which showed good properties as flocculants and which could be produced by a process which was easier and more efficient than the one according to D5. This problem was solved by the provision of an alternative polymer having a different microstructure.

The products of D5 were less homogeneous than those claimed. This different structure gave advantages in certain uses, although no such advantages or uses were specified. D5 taught against early mixing and indicated this was only permissible to the extent that no exchange of crosslinker between the two populations of particles occurred.
Thus the teaching of D5 necessarily excluded any consideration of processes such as in D6 or indeed the patent.
Even if D6 were to be considered as relevant, in that it disclosed addition of crosslinker after consumption of 25-90 % of the monomer, the document was concerned with polymers which were highly branched rather than long chain branched polymers as claimed. Furthermore D6 indicated as a particularly preferred embodiment the addition of crosslinker at the very beginning of the reaction in order to get highly crosslinked polymers. Consequently D6 provided no hint to the claimed solution of the problem with respect to D5 and the teachings of D5 and D6 were in effect incompatible.

Even if the value of 30% for the point in time at which the crosslinker was seen as arbitrary the examples of the patent showed that the later the crosslinker was added the greater the resulting Reduced Specific Viscosity (RSV).

With regard specifically to claim 4, the claimed process provided a simpler route to the polymers - this was by necessity a different problem to that of claim 1. In any case there was no motivation to combine the teachings of D5 and D6.

(b) First and second auxiliary requests

No further arguments were advanced.

XII. The appellant requested that the decision under appeal be set aside and that the European patent No. 1297039 be revoked.

XIII. The respondent requested that the appeal be dismissed, or, alternatively that the patent be maintained in amended form on the basis of the first or the second auxiliary request both filed with letter dated 17 May 2018 whereby the second auxiliary request was identical to the auxiliary request filed with letter dated 24 April 2018.

Reasons for the Decision

1. Main request

1.1 Novelty

Claim 1 is formulated in "product-by-process" format whereby the process aspect requires that polymerisation of an aqueous solution of monomers is initiated and a crosslinker is added after 30% polymerisation of the monomers. The product is defined as a mixture of linear and crosslinked polymers.

D5 also relates to a mixture of linear and crosslinked polymers. However according to the disclosure of D5 the polymers are prepared separately and combined. In particular reference is made to Table II, example 12 in which a crosslinked polymer and a linear polymer are separately prepared (in examples 2 and 5 respectively)

and then combined. The viscosity was calculated by the appellant as being in the claimed range, which finding was not disputed by the respondent.

The decision under appeal held that the polymers of the operative claims and those of D5 were distinct.

As the appellant, the onus was on the opponent to demonstrate that the findings of the decision were incorrect, i.e. that the polymers were not in fact distinguished.

Although neither party was able to provide a complete explanation of the nature of the polymer compositions of the operative claims and those of D5, in particular neither party was able to identify features beyond the product-by-process aspects which could serve as a distinction, by the same token the appellant was unable to demonstrate that the findings of the decision with respect to novelty were incorrect.

It has nevertheless been made plausible by the explanations provided by the respondent that the claimed polymers, which are a mixture of linear high molecular weight polymer and long chain branched polymer, would display, as a result of their preparation process, in particular addition of a cross-linking agent to the polymer solution after at least 30% polymerisation of the monomers has occurred, a different microstructure than the polymers prepared according to the process of example 12 of D5.

Consequently the Board can come to no other conclusion than that there are no grounds for overturning the findings of the decision under appeal with respect to novelty.

The conclusion is that the polymer of operative claim 1 is distinguished from that of D5 by the feature that the structure is different, notwithstanding that the exact nature of this difference is not known.

With regard to process claim 4 the distinguishing feature is that the process is carried out in a single solution whereby the crosslinker is added after a certain proportion of monomers has been consumed.

1.2 Inventive step

1.2.1 Closest prior art

It was a matter of consensus between the parties that D5 represented the closest prior art for both independent claims. Indeed, both the patent in suit and D5 relate to blends of polymers intended for use as flocculants/dewatering agents (patent in suit paragraph [0001]; D5, title, first paragraph).

1.2.2 Distinguishing feature

As noted above, the subject-matter of operative claim 1 is distinguished from the disclosure of D5 by the feature that the polymer has a different structure, while that of claim 4 is distinguished by the manner in which the process is carried out.

1.2.3 Technical effect

The patent itself contains no comparative examples which are suitable to demonstrate whether any technical effect rises compared to the compositions of D5 as a result of the above identified distinguishing feature.

No further evidence has been advanced to demonstrate the existence of any technical effect arising from the distinguishing feature.

1.2.4 Objective technical problem

Consequently for both independent claims the problem is be formulated as the provision of a further product/ process to prepare solutions containing mixtures of linear and crosslinked polymers.

1.2.5 The solution

Said problem was solved by modifying the process as indicated above.

1.2.6 Obviousness

D6 relates to solutions of linear and crosslinked polymers whereby the crosslinker is added after 25-90 % of the monomers have been consumed (claim 1, page 4, lines 23-30). This results in a mixture of crosslinked polymer and linear polymer as explained in the following paragraph of D6 (page 4, lines 31-41).

Consequently D6 provides an alternative method of preparing flocculants consisting of a mixture of linear and crosslinked polymers. Indeed D5 at page 14, lines 21-28 proposes a process in which the two solutions are combined at a stage where interdroplet transfer of crosslinking agent is no longer possible.

Hence D5 itself contains a pointer to such a process involving *in situ* forming of both components simultaneously.

This separation of linear polymerisation and crosslinking is precisely what D6 accomplishes by delaying addition of the crosslinker until such time as the linear polymer has formed to a greater or lesser extent.

Although D6 proposes adding crosslinker as early as after 25% of polymerisation of monomer and the operative claim requires addition at 30% polymerisation, there is no evidence for any technical effect associated with this aspect, which must therefore be considered as an arbitrary definition of the time, which is within the general teaching of D6.

Furthermore although D6 does envisage addition of the entirety of the crosslinker at the outset (page 5 line 52) this is a further, alternative embodiment of D6 which is directed to obtaining exclusively highly crosslinked polymers. The presence of this further embodiment does not invalidate the more general teaching of D6 directed to obtaining mixtures of linear and crosslinked polymers referred to above and the presence of this further embodiment in D6 does not render the entirety of the teaching thereof incompatible with D5.

Regarding the argument of the respondent with respect to the influence on the RSV of the resulting polymer of the point in time at which the crosslinker is added, the Board observes that all examples of the patent add the crosslinking agent after between 80 and 90% polymerisation of the monomer. The patent therefore provides no evidence which is suitable to demonstrate the existence of a technical effect associated with this feature, which therefore has to be seen as an arbitrary measure which is within the framework of the

general teaching of D6.

Under these circumstances, the proffered solution to the problem of providing further polymers having non-defined difference in structure to those known is obvious.

The same conclusion applies *mutatis mutandis* for the subject-matter of claim 4, relating to the process. Even if the problem were - in favour or the respondent - to be formulated as the provision of a simpler process the claimed solution would still be obvious in the light of the teachings of D6.

2. First auxiliary request

Claim 1 differs from claim 1 of the main request by specifying the the polymers are selected from the groups of emulsion polymers, dispersion polymers and gel polymers.

Since the cited example of closest prior art D5 relates to emulsion polymers, this request does not provide any further distinguishing feature, meaning that the above conclusion in respect of inventive step applies.

Under these circumstances a consideration of other matters, in particular the question of admittance of the request do not need to be addressed.

3. Second auxiliary request.

This request consists of a single claim, corresponding to claim 4 of the main request. The same conclusions with respect to inventive step apply.

4. In view of the above conclusion in respect of inventive step, it is not necessary for the Board to consider the further matter raised by the appellant, namely the issue of clarity arising from amendments made during the opposition proceedings.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

L. Stridde D. Marquis

Decision electronically authenticated