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Datasheet for the decision of 13 June 2018

Case Number: T 0026/14 - 3.3.03

Application Number: 06811856.1

Publication Number: 1939222

IPC: C08F2/26, C08F14/00, C08J3/16, C08J9/00

Language of the proceedings: EN

Title of invention:
PROCESS FOR PRODUCING AN AQUEOUS POLYTETRAFLUOROETHYLENE EMULSION, AND POLYTETRAFLUOROETHYLENE FINE POWDER AND POROUS MATERIAL PRODUCED FROM THE SAME

Patent Proprietor:
Asahi Glass Company, Limited

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (yes)

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Beschwerdekammern

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Case Number: T 0026/14 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 13 June 2018

Appellant: (Patent Proprietor)	Asahi Glass Company, Limited Shin-Marunouchi Building 1-5-1 Marunouchi Chiyoda-ku Tokyo 100-8405 (JP)
Representative:	Müller-Boré & Partner Patentanwälte PartG mbB Friedenheimer Brücke 21 80639 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 17 October 2013 revoking European patent No. 1939222 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	F. Rousseau
	C. Brandt

Summary of Facts and Submissions

I. The appeal lies against the decision of the opposition division posted on 17 October 2013 revoking European patent No. 1 939 222 announced in oral proceedings on 26 September 2013. The contested decision was based on a main request and an auxiliary request, both filed during the oral proceedings on 26 September 2013.

II. Claims 1, 5 and 7 of said main request read as follows:

"1. A process for producing an aqueous polytetrafluoroethylene emulsion characterized by carrying out emulsion polymerization of tetrafluoroethylene alone or together with another copolymerizable monomer in an aqueous medium, wherein a fluorinated emulsifier of the formula (1):

$XCF_2CF_2OCF_2CF_2OCF_2COOA$

wherein X is a hydrogen atom or a fluorine atom, and A is a hydrogen atom, an alkali metal or NH_4, is used in an amount of from 1,500 to 20,000 ppm, based on the final yield of polytetrafluoroethylene,
wherein the amount of said another copolymerizable monomer to be introduced at the beginning, is from 0 to 0.5 mass%, based on the final yield of polytetrafluoroethylene.

5. A process for obtaining a polytetrafluoroethylene fine powder, comprising the process according to any one of Claims 1 to 4 and coagulating the aqueous polytetrafluoroethylene emulsion to obtain said polytetrafluoroethylene fine powder.

7. A process for obtaining a porous material of polytetrafluoroethylene, comprising the process according to Claim 5 or 6 and carrying out paste extrusion of the polytetrafluoroethylene fine powder, followed by stretching to obtain said porous material of polytetrafluoroethylene."

The main request also contained claims 2 to 4 dependent on any of the preceding claims and claim 6 dependent on claim 5.

III. The following items of evidence were cited *inter alia* in the opposition proceedings:

D3: JP 2003-119204 A
D5: US 3,271,341
D6: WO 2005/042593 A1
D6T: EP 1 688 441 A1 (publication of D6 in accordance with Article 158(3) EPC 1973)
D9: Kirk-Othmer, Encyclopedia of Chemical Technology, 4th Edition, Volume 11, pages 621-626 and 633-637.

IV. According to the reasons for the contested decision the claims as amended met the requirements of Articles 123(2), 123(3) and 84 EPC, as well as those of Rule 80 EPC. It was also considered that the claimed processes were novel, in particular over Example XVI of D5 which disclosed the use of the surfactant defined in claim 1 of the main request, but in a different amount. Regarding inventive step, D3 was the closest prior art, from which the process of claim 1 of the main request differed only by the use of the surfactant defined therein. In the absence of any evidence that this specific surfactant brought about any effect the problem solved over the closest prior art was seen as the provision of a further process complying with

environmental regulations (i.e. avoiding the use of ammonium perfluorooctanoate (APFO)) and resulting in a polymer with a high particle size and a high molecular weight. The solution to this problem which consisted in the use of the specific surfactant defined in claim 1 was suggested by D5. The skilled person starting from D3 would increase in an obvious manner the amount of emulsifier disclosed in Example XVI of D5 to the levels used in D3 in order to reduce the formation of agglomerates, arriving thereby at the subject-matter of claim 1. The auxiliary request was not admitted into the proceedings.

V. The patent proprietor (appellant) appealed said decision and submitted with the statement setting out the grounds of appeal (letter of 14 February 2014) among others a main request and auxiliary requests 1 to 3, the main request corresponding to that underlying the contested decision whose claims are indicated in above section II.

VI. The opponent (respondent) replied to the statement of grounds of appeal of the patent proprietor with a letter of 26 June 2014 before withdrawing the opposition with a letter of 27 November 2014.

VII. The appellant submitted that D3 represented the closest prior art. Even though D3 was concerned with environmental problems, this document did not mention that environmental problems had been solved. D3 even taught the use of emulsifiers which caused impact on the environment, as demonstrated by the data provided in D6 and the measures made by the appellant. Those concerned two preferred fluorinated surfactants of D3 having higher LogPOW values than APFO and one preferred embodiment which had a LogPOW value similar to that of

APFO. Accordingly, the technical problem solved by the process of operative claim 1 over D3 was the provision of an emulsion polymerisation process for producing an aqueous polytetrafluoroethylene (PTFE) emulsion which caused less impact on the environment, while providing PTFE having sufficiently high molecular weight and average primary particle size. The allegation that the patent proprietor had calculated the LogPOW values of the surfactants used in D3 and that the skilled person would do the same was unfounded, since those had been measured, as was also done in D6. D3 did not describe or suggest any LogPOW values, so that it was impossible to compare the LogPOW values of the surfactants used in D3 and the LogPOW values indicated in D6 and to extract from this comparison the influence of the number of carbon atoms of a surfactant on its LogPOW value. In addition D5 was not concerned with environmental problems. Consequently, it was not obvious for the skilled person to use the surfactant of formula (1) in order to provide a solution to the problem solved over D3. An inventive step was therefore to be acknowledged.

VIII. According to the submissions of the former opponent, D3 constituted the closest prior art, from which the claimed process differed only by the use of an emulsifier or formula (1). This document disclosed the preparation of PTFE particles having the same particle size and diameter, as well as the same specific gravity values as those obtained in the patent in suit. In addition D3 disclosed with surfactant (a1) of formula $CF_3OCF(CF_3)CF_2OCF(CF_3)COONH_4$ an emulsifier having a LogPOW value of 3.4, i.e. lower than that of APFO. Accordingly, the objective technical problem solved over D3 by the claimed process merely resided in the provision of an alternative process. Faced with that problem, the skilled person would have been able to

calculate the LogPOW values of the fluorinated surfactants of D3, to compare them with that of the fluorinated surfactants according to D6 and to derive from D6 the teaching that fluorinated surfactants with a lower number of carbon atoms had lower LogPOW values than those of D3. Based on that finding the skilled person would have been directed to Example XVI of D5 which taught the use of the fluorinated surfactant EEA employed in the examples of the patent in suit. Based on the knowledge of D9 teaching that a sufficient amount of dispersing agent was necessary and noting that the other examples of D5 employed a larger amount of surfactant than Example XVI, the skilled person would have adjusted the amount of surfactant in order to avoid formation of coagulum. Accordingly, the skilled person would have arrived at the selection of the surfactant of formula (1) by combining the teachings of D3, D5 and D6 without exercising any inventive effort. An inventive step was therefore to be denied.

IX. The appellant requested that the decision under appeal be set aside and the patent be maintained on the basis of the main request, or alternatively on the basis of any of auxiliary requests 1 to 3, all requests filed with letter of 14 February 2014.

Reasons for the Decision

Procedural issues

1. During appeal, the sole opponent withdrew its opposition, the patent proprietor being now the sole remaining party to the appeal proceedings. According to

established case law (see Case Law of the Boards of Appeal of the EPO, 8th edition, 2016, IV.C.4.3.3) the withdrawal of an opposition has no direct procedural consequences for the appeal proceedings if the opponent was the respondent and the patent was revoked by the contested decision, as it is the principal task of the boards of appeal to review the decision under appeal on the basis of the appellant's requests. In such case, the board must carry out a substantive examination of the opposition division's decision, and can only set aside this decision if the grounds for opposition do not prejudice the maintenance of the patent. The board's examination can include the examination of submissions and evidence filed by the respondent prior to the withdrawal of the opposition. This, however, cannot mean that the appeal procedure should become more investigative following the withdrawal of the opposition and that the Board should take a more active role substituting itself for the former opponent, since there is no justification for the former opponent taking advantage of the withdrawal of its opposition.

Novelty

2. The Board has no reason to question novelty of the claimed process which was acknowledged in the impugned decision and is not disputed any longer. The Board is satisfied as indicated in the contested decision that the surfactant used in Example XVI of D5 corresponds to that defined in operative claim 1, which however is used in D5 in an amount of 1039 ppm based on the final yield of polytetrafluoroethylene, i.e. below the minimum amount of 1500 ppm defined in operative claim 1.

Inventive step

Closest state of the art

3. According to paragraph [0016] of the patent in suit, an object of the present invention is to provide an emulsion polymerization process for producing an aqueous PTFE emulsion which does not substantially contain APFO, which is able to provide PTFE having a high molecular weight and to increase the average primary particle size at a level of from 0.18 to 0.50 µm.

3.1 Having regard to paragraphs [0004] and [0059] of the specification, a surfactant other than APFO is to be employed, since this compound in particular has a high potential for accumulation in living organisms (bioaccumulation). In order words, an object of the patent in suit is to provide an emulsion process for producing a PTFE having the properties recited above and which uses a surfactant leading to lower bioaccumulation than APFO. The potential for bioaccumulation of a surfactant can be expressed by its 1-octanol/water partition coefficient LogPOW, lower values indicating a lower tendency for bioaccumulation (paragraphs [0056] and [0060] of the specification).

3.2 The appellant and the former opponent, in line with the contested decision, have argued inventive step starting from the disclosure of D3, which as shown in its paragraphs [0005] is concerned like the patent in suit with the use of surfactants having little impact on the environment and ecosystems. The Board is therefore satisfied that D3 represents an adequate starting point for assessing inventive step of the process of operative claim 1. It is undisputed that the process of

operative claim 1 differs from those disclosed in D3 by the use of the fluorinated emulsifier of formula (1).

Problem successfully solved over D3

4. Having regard to the disclosure of D3, the appellant submitted in line with the goal of the present invention indicated in the specification that the technical problem solved by the process of operative claim 1 over D3 was the provision of an emulsion polymerisation process for producing an aqueous PTFE emulsion which should cause less impact on the environment, while being able to provide PTFE having sufficiently high molecular weight and average primary particle size, whereas the former opponent argued that the objective technical problem solved over D3 would merely reside in the provision of an alternative process to the one disclosed in that document.

4.1 One of the fluorinated emulsifiers in accordance with the subject-matter of claim 1, namely $CF_3CF_2OCF_2CF_2OCF_2COONH_4$ (hereafter EEA) has a LogPOW value of 3.13 as indicated in Table 1 of the patent in suit, which is below that of APFO (3.67). Moreover, a comparison of the LogPOW values of emulsifier 1 (Synthesis Example 1) and emulsifier 4 (Synthesis Example 4) disclosed in Table 1 of D6T (page 15 and paragraphs [0017], [0018] and [0180] of D6T indicating that the logP values indicated in that table are the LogPOW values of those emulsifiers) shows that all things being equal the replacement of one of the F atoms in a terminal CF_3 group of a fluorinated emulsifier by a hydrogen atom leads to a reduction of the LogPOW value. Accordingly, it is therefore credible that the replacement of one of the F atoms in the terminal CF_3 group of EEA by a hydrogen atom, obtaining

thereby the embodiment of operative claim 1 wherein X is hydrogen in formula (1), will also lead to a reduction of the LogPOW value in comparison to EEA, which emulsifier already has a LogPOW value below that of APFO. Considering further that the nature of cation A in formula (1) of claim 1 is not believed to make a noticeable difference in the partition of the surfactant between octanol and water, the Board has no reason to doubt that all emulsifiers defined in operative claim 1 exhibit a LogPOW value which is below that of APFO and therefore lead to a lower tendency for bioaccumulation than APFO.

4.2 D3 is concerned with the use of various fluorine containing emulsifiers for producing PTFE emulsions, which emulsifiers are defined in claim 1 of that document. Even if D3 appears to teach that the emulsifiers used should have little impact on the environment (see paragraphs [0004] and [0005]), D3 does not provide any specific indication in this respect. In particular, D3 does not provide any LogPOW value of the emulsifiers described in that document.

4.3 The appellant indicated the LogPOW values of three surfactants recommended in D3, in particular that used in Example 1 of that document which has a LogPOW value of 4.52, i.e. which is higher than that of APFO. The appellant, however, did not provide further data or any arguments concerning the other emulsifiers taught in D3 on the basis of which the Board could conclude that the emulsifiers defined in operative claim 1 must be considered to exhibit lower LogPOW values than all emulsifiers disclosed in D3.

4.4 Finally, there is no indication on file, let alone evidence submitted in this respect, that the use of the

fluorinated emulsifier of formula (1) brings about any advantage in terms of molecular weight or average primary particle size of the produced PTFE when compared to the emulsifiers used in D3.

4.5 In view of the above, the Board concludes that the problem successfully solved by the process of operative claim 1 over the disclosure of D3 can be formulated as the provision of a further emulsion polymerisation process for producing an aqueous PTFE emulsion, which process causes less impact on the environment than APFO.

Obviousness of the solution

5. It remains to be decided whether or not the proposed solution to the above problem, namely the use of the emulsifier of formula (1) is obvious in view of the state of the art.

5.1 As already indicated in above section 4.2, D3 does not contain any indication of the LogPOW values of the fluorinated surfactants disclosed therein. There is also no indication that these values are reported in the state of the art. The central argument of the former opponent that the skilled person would be able to calculate the LogPOW values of the fluorinated surfactants used in D3, which was disputed by the appellant, is not supported by any evidence. The Board notes in this respect that the LogPOW values of various emulsifiers were not calculated in D6, but were measured (see Table 1).

5.2 The argument of the former opponent that a comparison between the LogPOW values of the emulsifier of D6, presumably those described in Table 1 on page 15 (since

D6 does not disclose any other LogPOW values for other specific emulsifiers) and those described in D3 would give a hint to the skilled person to use a fluorinated surfactant with a lower number of carbon atoms is not further explained. It was in particular not specified which emulsifiers of D3 (whose LogPOW values are unknown) and those of D6 should be compared, so that the Board is not in the position to verify the validity of the assertion made by the former opponent. In the absence of any explanation concerning the dependency of the LogPOW value from various structural elements of a surfactant which should be known to the skilled person, and evidence in this respect, the Board must conclude that the skilled person starting from D3 would not find any hint to use an emulsifier of formula (1) as defined in operative claim 1, if an emulsifier causing less impact on the environment than APFO was sought.

5.3 It is moreover indisputed that the LogPOW values of the emulsifier EEA used in Example XVI of D5 was not known to the skilled person and that this document is not concerned with environmental aspects linked to the use of specific emulsifiers in the production of an aqueous PTFE emulsion by emulsion polymerisation.

5.4 Under these circumstances, the Board cannot follow the reasoning of the opposition division. In addition, as shown in above sections 5.1 to 5.3 the arguments of the former opponent are not sufficient to convince the Board that the skilled person starting from D3 and faced with the problem identified in above point 4.5 would have been directed in an obvious manner to the use of the emulsifier described in Example XVI of D5.

6. Accordingly, the Board must conclude that no case has been made that the subject-matter of claim 1 does not

involve an inventive step when D3 is taken as the closest prior art.

7. It is also immediately apparent, based on the above analysis and the fact that D6 discloses emulsion polymerisation processes for producing an aqueous PTFE emulsion, which processes cause less impact on the environment than APFO (see Table 1 on page 15, Synthesis Examples 1 to 4), that D6 also represents a suitable starting point for assessing inventive step which is not more remote than D3. Having regard to this state of the art, the problem successfully solved by the process of operative claim 1 would be defined in the same manner as in above section 4.5. For the same reasons as indicated above, it was not shown that the choice of the emulsifier defined in operative claim 1 in order to solve said problem would be obvious to the skilled person. Accordingly, one would arrive at the same conclusion concerning inventive step of the subject-matter of claim 1 of the main request both if one starts from D3 or from D6 as the closest prior art.

8. The processes according to the remaining claims of the main request, which all comprise the steps of process claim 1, are by the same token also considered to involve an inventive step.

9. In the absence of any additional objection against the main request, the Board concludes that the main request is allowable.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the opposition division with the order to maintain the patent on the basis of the claims of the main request as filed with letter of 14 February 2014 and after any necessary consequential amendment of the description.

The Registrar: The Chairman:

L. Stridde D. Semino

Decision electronically authenticated