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Datasheet for the decision of 10 August 2023

Case Number: T 2422/22 - 3.3.03

Application Number: 19197396.5

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IPC: C08L101/02, C08L51/00, C08F290/00, C08F265/00, C08G83/00, C10L1/198

Language of the proceedings: EN

Title of invention:
ASSOCIATIVE POLYMERS AND RELATED COMPOSITIONS, METHODS AND SYSTEMS

Applicant:
California Institute of Technology

Relevant legal provisions:
EPC Art. 84, 83, 111(1)
RPBA 2020 Art. 12(4), 11

Keyword:
Admittance of evidence - (yes)
Claims - clarity (yes)
Sufficiency of disclosure - (yes)
Remittal - (yes)

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Case Number: T 2422/22 - 3.3.03

D E C I S I O N
of Technical Board of Appeal 3.3.03
of 10 August 2023

Appellant: (Applicant)	California Institute of Technology 1200 East California Boulevard, M/S 201-85 Pasadena, CA 91125 (US)
Representative:	HGF HGF Limited 1 City Walk Leeds LS11 9DX (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 30 June 2022 refusing European patent application No. 19197396.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	D. Semino
Members:	D. Marquis
	R. Cramer

Summary of Facts and Submissions

I. The appeal lies against the decision of the examining division refusing European patent application No. 19 197 396.5.

Claim 1 of the main request underlying the contested decision (filed with letter of 4 April 2022) reads as follows:

"1. A method to control in a non-polar composition a physical and/or chemical property selected from mist control, drag reduction, fuel efficiency, enhanced lubrication and converting a liquid into a gel, the method comprising

providing a host composition having a dielectric constant equal to or less than 5;

providing at least one associative polymer soluble in the host composition;

determining an overlap concentration c^* for the at least one associative polymer;

determining a concentration c of the at least one associative polymer in the host composition, the concentration c selected between from $0.05c^*$ to $10c^*$ depending on the physical and/or chemical property to be controlled; and

combining the host composition and the at least one associative polymer herein described at the selected concentration c;

wherein the at least one associative polymer comprises a linear, branched, or hyperbranched polymer backbone having at least two ends and a functional group presented at two or more ends of the at least two ends of the backbone,

wherein the linear, branched, or hyperbranched polymer backbone is substantially soluble in the non-polar composition, and the functional group is capable of undergoing an associative interaction with another functional group of the at least one associative polymer in the host composition with an association constant (k) of from $0.1 < \log_{10} k < 18$ and
wherein

$$c^* = \frac{3M_w}{4\pi(R_g^2)^{3/2} N_a},$$

wherein M_w is the weight averaged molecular weight, R_g is the radius of gyration, and N_a is Avogadro's constant".

II. The decision of the examining division was based, *inter alia*, on documents D4 and E1:

D4: L. J. Fetters, N. Hadjichristidis, J. S. Lindner, J. W. Mays; Molecular Weight Dependence of Hydrodynamic and Thermodynamic Properties for Well-Defined Linear Polymers in Solution. Journal of Physical and Chemical Reference Data; 1 July 1994; 23 (4): 619–640. https://doi.org/10.1063/1.555949

E1: Sworn Statement dated 15 August 2019 by Prof. Christopher Martin Bates of the University of California, Santa Barbara

III. In their decision the examining division concluded that claim 1 of the main request lacked clarity (Article 84 EPC) and its subject-matter was not sufficiently disclosed (Article 83 EPC). In particular, the examining division came to the conclusion that claim 1 of the main request did not define the measurement method and the conditions (composition and temperature) used for the determination of the radius of gyration R_g. It was known that the value of R_g depended on the measurement conditions and it was established that several methods for the determination of R_g existed that resulted in different values. The lack of a measurement method for R_g also resulted in a lack of sufficiency of disclosure of the subject-matter of claim 1 of the main request. The same conclusions applied to auxiliary requests 1 to 12.

IV. The applicant lodged an appeal against that decision and requested that the decision be set aside and that a patent be granted on the basis of the claims of the main request or of one of auxiliary requests 1 to 14 submitted with their statement setting out the grounds of appeal. The applicant also requested the reimbursement of the appeal fee on the grounds that a substantial procedural violation was committed by the examining division.

The claims of the main request correspond to the claims of the main request on which the decision under appeal was based. The amendments in the auxiliary requests are not relevant for the present decision.

With the statement of grounds of appeal the appellant additionally filed the following document:

E26: “Polymer Solutions: An Introduction to Physical Properties”, I. Teraoka, Wiley-Interscience, 2002, page 108

V. Further arguments and statements were provided by the appellant with their letter of 24 July 2023.

VI. A phone conversation took place between the Board and the appellant on 25 July 2023.

VII. With letter of 31 July 2023 the appellant amended their requests and requested remittal of the patent application to the examining division for further examination on condition that the claims of the main request were found to meet the requirements of Articles 83 and 84 EPC. The request for oral proceedings was withdrawn insofar as this condition was satisfied (e.g. the claims of the main request were found to satisfy the requirements of Articles 83 and 84 EPC). The request for reimbursement of the appeal fee and any associated request for oral proceedings relating to the alleged substantial procedural violation was withdrawn.

VIII. The final request of the appellant was thus as follows:

- The appellant requests that the decision under appeal be set aside and that the case be remitted to the examining division for further examination on condition that the claims of the main request submitted with their statement setting out the grounds of appeal are found to meet the requirements of Articles 83 and 84 EPC.

IX. The appellant's arguments, in so far as they are pertinent to the present decision, may be derived from the reasons for the decision below. They are

essentially as follows:

- E26 should be admitted into the proceedings.

- Claim 1 of the main request satisfied the requirements of clarity and of sufficient disclosure.

- The case should be remitted to the examining division for further prosecution.

Reasons for the Decision

1. Admittance E26

1.1 E26 is a document showing the common general knowledge about the determination of the radius of gyration of polymers. It was filed with the statement of grounds of appeal and the appellant requested its admittance into the proceedings. Since E26 is not needed for the present decision, there is no need to address the question of its admittance.

Main request

2. Clarity and sufficiency of disclosure

2.1 The reasoning of lack of clarity contained in the contested decision only concerns the definition of the radius of gyration R_g in claim 1 of the main request. The objections of lack of clarity against the definition of the association constant k raised in writing and discussed at the oral proceedings was apparently not pursued by the examining division. The

Board does not see any reason to address the clarity of that parameter any further.

2.2 The examining division concluded that claim 1 of the main request lacked clarity because the measurement method of the radius of gyration was not defined in the claim whereas
(i) the value of that parameter depended on the conditions (composition and temperature) at which it was measured, which conditions were neither defined, nor implicit in claim 1 (page 12, third to fifth paragraphs) and
(ii) the parameter could be determined by several known methods which did not yield the same result (page 13, fourth paragraph to page 14, fourth paragraph).

2.3 With regard to (i), the conditions at which the radius of gyration is to be measured, the examining division considered that it was not implicit that the parameter had to be measured in the host composition. The applicant argued that the conditions for the measurement of the radius of gyration were implied by the wording of the method defined in claim 1 (statement setting out the grounds of appeal, sections 110-131).

2.4 Claim 1 concerns a method to control in a non-polar composition a physical and/or chemical property selected from mist control, drag reduction, fuel efficiency, enhanced lubrication and converting a liquid into a gel, the method comprising a number of steps including the solubilisation of an associative polymer in the composition, the concentration of the associative polymer used to control the chosen physical and/or chemical property being defined by a formula including the radius of gyration of the associative

polymer.

2.5 It is apparent from claim 1 that the control of the listed physical and/or chemical properties is to be carried out under given conditions, such as the temperature, which are not specified in the claim. The wording of claim 1, however, sets out that the control of the chosen property depends on the concentration of associative polymer present in the non-polar composition by virtue of the steps of "determining an overlap concentration c* for the at least one associative polymer" and "determining a concentration c of the at least one associative polymer in the host composition, the concentration c selected between from 0.05c* to 10c* depending on the physical and/or chemical property to be controlled" (emphasis added). Claim 1 therefore establishes a direct link between the activity being performed (the control of the property), the concentrations c and c* (c being selected between from 0.05c* to 10c*) and, by the formula provided in claim 1 for c*, the radius of gyration R_g of the associative polymer.

2.6 The wording of claim 1 therefore implies that the value of the concentration of associative polymer and therefore the value of the radius of gyration needed for its determination are those obtained (by measurement or from values compiled in the prior art) under the conditions at which the method of claim 1 is operated.

2.7 The Board also finds that it is unambiguous from claim 1 that the concentration c* (and thus also the radius of gyration) must be determined in accordance with the end purpose, which means that the temperature chosen to control a given property has to be also the temperature

at which the radius of gyration is determined. Therefore, even if the value of the radius of gyration is dependent on the conditions under which it is determined, it is unambiguous from the definition of the method in claim 1 of the main request that the radius of gyration is obtained under the conditions used when performing the claimed method.

2.8 The examining division also concluded that claim 1 lacked clarity because (ii) the radius of gyration could be determined by several known methods which did not yield the same value. The appellant submitted in appeal that none of the references cited by the examining division supports that conclusion (statement setting out the grounds of appeal, sections 59-109). In particular, the appellant considered that D4 did not show that the value obtained for R_g was dependent on the experimental technique used for its measurement.

2.9 It is apparent from the decision under appeal that the examining division based their conclusion on lack of clarity on part 6.2 of D4 and on the comparison of equations (37), (38) and (39) on page 628 of D4 (last two paragraphs on page 13 of the contested decision). The decision however does not further establish what was considered in part 6.2 of D4 that could show a relevant influence of the method of measurement on the value of the radius of gyration as the methods used to determine the radius of gyration R_g in Table 7 are not disclosed.

2.10 The Board finds that the few values of radius of gyration R_g obtained for polystyrenes of corresponding molecular weights reported in Table 7 of D4 but measured in different publications (therefore more than probably obtained from different processes) do not show

a difference in the values of Rg that could be seen as being significant and going beyond the accuracy of the measurement. That appears to be confirmed by the equations (37), (38) and (39) and their discussion on page 628 of D4 (left column) which mentions a fairly good agreement between the values of R_g obtained with the different correlations. That is also shown by the appellant in sections 82-91 of their statement setting out the grounds of appeal. In view of this and considering also the supporting arguments provided in document E1 (sections 16 and 19), the Board concludes that, on the basis of the evidence available and discussed in the contested decision, it can be accepted that the available methods of measurement yield approximately the same results, so that the lack of a method of measurement of the radius of gyration R_g in claim 1 of the main request does not result in lack of clarity.

2.11 Since the conclusion on a lack of sufficiency of disclosure is presented as resulting from the conclusion of a lack of clarity in the contested decision, the Board also finds in view of the conclusions reached above that it cannot be concluded that claim 1 of the main request is insufficiently disclosed.

3. Remittal of the case

3.1 The appellant requested that the case be remitted to the examining division for further examination since the decision under appeal was limited to the requirements under Articles 83 and 84 EPC.

3.2 According to Article 11 RPBA 2020 the Board shall not remit the case to the department whose decision was

appealed for further prosecution unless special reasons present themselves for doing so. In the present case, however, the decision under appeal indeed only pertains to the requirements of Articles 83 and 84 EPC. Considering that it must still be assessed whether the other requirements of the EPC are met (in particular novelty and inventive step) and in view of the request for remittal of the appellant, the Board finds that special reasons are present and considers it appropriate to remit the case to the examining division for further prosecution according to Article 111(1) EPC.

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 for further prosecution.

The Registrar: The Chairman:

D. Hampe D. Semino

Decision electronically authenticated