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D E C I S I O N
of 8 January 2002

Case Number: T 0547/99 - 3.3.3

Application Number: 90302756.3

Publication Number: 0389179

IPC: C08F 283/06

Language of the proceedings: EN

Title of invention:
Addition polymer particles

Patentee:
Orica Australia Pty Ltd

Opponent:
BASF Aktiengesellschaft

Headword:

-

Relevant legal provisions:
EPC Art. 54, 56

Keyword:
"Novelty (yes) - implicit disclosure (no)"
"Inventive step (yes) - non-obvious combination of known
features (product and process)"

Decisions cited:
T 0595/90, T 0233/93

Catchword:

-



Case Number: T 0547/99 - 3.3.3

D E C I S I O N
of the Technical Board of Appeal 3.3.3
of 8 January 2002

Appellant: BASF Aktiengesellschaft
(Opponent) D-67056 Ludwigshafen (DE)

Representative: Riedl, Peter, Dr.
Patentanwälte
Reitstötter, Kinzebach & Partner
Postfach 86 06 49
D-81633 München (DE)

Respondent: Orica Australia Pty Ltd
(Proprietor of the patent) 1 Nicholson Street
Melbourne
Victoria 3000 (AU)

Representative: Harrison, Ivor Stanley
Withers & Rogers
Goldings House, 2 Hays Lane
London SE1 2HW (GB)

Decision under appeal: Decision of the Opposition Division of the
European Patent Office posted 8 March 1999
rejecting the opposition filed against European
patent No. 0 389 179 pursuant to Article 102(2)
EPC.

Composition of the Board:

Chairman: R. Young
Members: P. Kitzmantel
U. J. Tronser

Summary of Facts and Submissions

I. Mention of the grant of European patent No. 0 389 179 in respect of European patent application No. 90 302 756.3 in the name of ICI Australia Operations Proprietary Limited (now Orica Australia Pty Ltd), which had been filed on 15 March 1990 claiming an AU priority of 23 March 1989, was announced on 15 November 1995 on the basis of 15 claims, independent Claims 1, 10, 14 and 15 reading as follows:

"1. Very small water-insoluble polymer particles capable of forming a stable aqueous dispersion wherein the particles have a maximum average diameter of 100 nm and a core-sheath structure in which the core contains addition polymer and the sheath contains hydrophilic polyoxyalkylene chains containing an average of 6 to 40 oxyalkylene units per chain characterised in that

(a) at least 20 wt% of the polyoxyalkylene chains are attached to the addition polymer of the core via covalent bonds and

(b) the sheaths contain sufficient of the polyoxyalkylene chains for the mass ratio of the core to sheath to be from 98:2 to 60:40.

10. A process for the preparation of a stable aqueous dispersion of water-insoluble polymer particles wherein the particles have a core-sheath structure in which the core contains addition polymer and the hydrophobic moiety of an amphiphile and the sheath contains solvated hydrophilic polyoxyalkylene chains of the amphiphile and the polyoxyalkylene chains have an average of 6 to 40 oxyalkylene units per chain

characterised in that

- (a) ethylenically unsaturated monomer is polymerised in an aqueous medium in the presence of the amphiphile,
- (b) the hydrophobic moiety of the amphiphile contains at least one ethylenic double bond
- (c) sufficient polyalkylene chains are present in the aqueous medium to ensure that the mass ratio of the cores to sheaths is from 98:2 to 60:40 and
- (d) the polymerisation is initiated at under 40EC.

14. A stable aqueous dispersion of water-insoluble polymer particles characterised in that the dispersion contains particles as claimed in any one of Claims 1 to 9 or as made by a process according to any one of Claims 10 to 13.

15. A coating composition containing film-forming material characterised in that the film-forming material includes an aqueous dispersion as claimed in Claim 14."

Claims 2 to 9 are dependent on Claim 1, Claims 11 to 14 are dependent on Claim 10.

II. Notice of Opposition requesting revocation of the patent in its entirety on the grounds of Article 100(a) EPC was filed by BASF Aktiengesellschaft on 16 August 1996.

The opposition was i.a. based on documents

D1: US-A-4 413 073,

D2: EP-A-0 013 478,

D3: US-A-4 587 290, and the later filed and admitted documents

D8: US-A-3 740 367, and

D9: Ullmann's Encyclopedia of Industrial Chemistry, 5th ed., vol. A21, VCH Publishers 1992, pages 305 and 320.

Document

D5: Surface Coatings, vol. 1, Raw Materials and their Usage, Prepared by the Oil and Colour Chemists' Association, Australia, Tafe Educational Books, Randwick (AU), second ed. 1983, pages 171 to 175

was introduced into the opposition proceedings by the Patentee.

III. In its interlocutory decision orally announced on 24 February 1999 and issued in writing on 8 March 1999 the Opposition Division found that the patent could be maintained in amended form, ie on the basis of the claims as granted except for the amended introductory portion of Claim 10 reading: "A process for the preparation of a stable aqueous dispersion of water-insoluble polymer particles according to any of claims 1 to 9 ...".

It was held in that decision that the subject-matter of

the opposed patent was novel, *inter alia* because none of the citations disclosed sterically stabilised dispersions of particles having a maximum average diameter of 100 nm and/or a method for their preparation comprising a polymerisation initiation temperature of under 40°C. The subject-matter was also considered to involve an inventive step, because, in the Opposition Division's view, the state of the art did not suggest the claimed solution of the technical problem existing with respect to the closest prior art as represented by D3, ie the provision of dispersions having good rheological properties at high solids content suitable for the preparation of high gloss coatings.

- IV. On 17 May 1999 the Opponent (Appellant) lodged an appeal against the decision of the Opposition Division and paid the appeal fee on the same day. The Statement of Grounds of Appeal was submitted on 19 July 1999.

- V. The arguments presented by the Appellant in their written submissions dated 16 July 1999 (Statement of Grounds of Appeal) and 8 November 2001 as well as during the oral proceedings held on 8 January 2002 may be summarized as follows:
 - (i) Document D2 was novelty destroying for the subject-matter of all independent claims of the patent in suit because it disclosed aqueous dispersions having all the features of the claimed polymer particles, including their maximum diameter and the number of oxyalkylene units comprised by the sheath portion of the particles, as well as all features of the claimed method of preparation, including polymerisation initiation temperatures of below 40°C.

- (ii) In the Appellant's view, also document D3 was novelty destroying for the subject-matter of present Claims 1 and 10 because the methods of preparation, including a polymerisation initiation temperature of under 40°C, of the respective dispersions were identical, and, for that reason, particle sizes of up to 100 nm, although not explicitly mentioned in D3, were within this document's implicit disclosure.

- (iii) Concerning the issue of inventive step, the Appellant pointed out that it was known from document D8 that ionically stabilised aqueous dispersions of polymers which were *inter alia* derived from methyl methacrylate and an unsaturated acid and which contained particles within the size range of 0.01 to 0.1 µm (10 to 100 nm), provided a favourable viscosity-shear relationship, had improved brush levelling properties and could be used to produce glossy coating films.

- (iv) In the Appellant's opinion, it was obvious to a skilled person wishing to obtain the same beneficial properties from the sterically stabilized polymer dispersion of D3, to select, from the set of reaction conditions comprised by the disclosure of this document, those which led to the formation of particles in the claimed size range up to 100 nm. This only required routine operations which did not involve any inventive effort.

- (v) In this context, the choice of a polymerisation initiation temperature under 40°C was at least foreshadowed by the statement in D3 that "in most cases, the temperature will not need to exceed 50°C", because the skilled person was aware from D9 that redox initiation is usually carried out between 0 and 50°C.

(vi) Moreover, in the Appellant's view, evidence was lacking for an improvement of the rheological properties of the claimed dispersions and/or the gloss of coatings derived therefrom. Experiments carried out by the Appellant (cf. Experimental Reports attached to each one of the afore-mentioned written submissions) rather showed that (a) the viscosity of dispersions having the same solids contents increased with decreasing particle size at any shear velocity, (b) the viscosity of "inventive" dispersions decreased with increasing shear velocity, while (c) the viscosity-shear behaviour of prior art dispersions according to D3 was less dependent on the shear velocity, ie was closer to a Newtonian behaviour, especially at low shear velocity, and, thus, "better" than the same behaviour of "inventive" dispersions.

(vii) The Appellant concluded from these results that the problem underlying the claimed invention did not comprise any improvement of the rheology of the dispersions, but could only be seen in the development of dispersions which provide coatings of improved gloss.

(viii) In its view, however, it was obvious to solve this problem by the use of dispersions having smaller particles, because an improved gloss was an immediate consequence of the better penetration of such a dispersion into a porous substrate.

VI. The arguments presented by the Respondent in their written submissions dated 27 March 2000 and 10 December 2001 as well as during the oral proceedings may be summarized as follows:

- (i) Document D2 was not novelty destroying for Claim 1, because it did not disclose aqueous dispersions comprising polymer particles having a maximum diameter of 100 nm, nor did it disclose that the sheath portion of the particles comprised polyoxyalkylene chains containing an average of 6 to 40 oxyalkylene units per chain.

- (ii) Similarly, document D3 was not novelty destroying, because the lowest particle size disclosed therein was 111 nm and the polymerisation initiation temperature used according to the Examples of D3 was higher than the maximum of 40°C permitted by Claim 10 of the patent in suit. As to the number of oxyalkylene units per chain of the sheath portion of the particles, the Respondent expressed doubts that the reference in Claim 1 of D3 to polyethylene glycol chains having a molecular weight down to 500 was in line with the description of this document which disclosed polyethylene glycols having a molecular weight in the range of 2000 to 4000.

- (iii) In the Respondent's view, the claimed subject-matter was also inventive over the closest prior art according to D3 because this citation failed to suggest the solution of the existing technical problem, ie the provision of sterically stabilised dispersions having an improved rheology, especially a low viscosity at low shear rates, as evidenced by Example 1 of the patent specification.

- (iv) The upper limit of the particle size of 100 nm according to present Claim 1 was not an arbitrary feature, as contended by the Appellant, but was clearly meaningful in respect of the afore-mentioned problem,

as underlined by the importance attached thereto in document D8, which otherwise was, however, a remote state of the art, because it related to ionically stabilised dispersions.

(v) The Appellant's criticism of the experimental results of the patent in suit was unjustified because its counter-evidence failed to adhere to essential features of document D3.

VII. The Appellant requested that the decision under appeal be set aside and that the European patent No. 0 389 179 be revoked.

The Respondent requested that the appeal be dismissed.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendment*

The only amendment concerns the insertion into the introductory portion of Claim 10 of the statement "according to any of Claims 1 to 9". Since this statement is in accordance with the overall disclosure of the opposed patent and since it amounts to a restriction of the scope of Claim 10, the requirements of Article 123(2) and (3) EPC are met.

3. *Citations*

3.1 Document D2

Claim 1 of this document relates to a process for the production of a sterically stabilised dispersion of polymer particles of a size in the range 0.1 to 10 μm (100 to 10000 nm) comprising the polymerisation in an aqueous medium of one or more ethylenically unsaturated monomers at a temperature which is at least 10°C higher than the glass transition temperature of the polymer which is formed (page 8, lines 9 to 10: in general a temperature in the range of 30 to 80°C), in the presence in the aqueous medium of a block or graft copolymer stabiliser (Claim 5: "A_nB") which contains in the molecule a polymeric component (Claim 5: "A") which is solvatable by the aqueous medium and another polymeric component (Claim 5: "B") which is not solvatable therein and is capable of becoming associated with the polymer particles formed, the total amount of the monomer polymerised being such that the resulting dispersion contains at least 20% by weight of polymer.

According to Example 1 a methacrylate ester of methoxy(polyethylene glycol) of a molecular weight of about 2000, was used as graft copolymer stabiliser in the "seed and feed" polymerisation of a mixture of methyl methacrylate and butyl acrylate. The polymerisation initiation temperature of the "seed" stage was the reflux temperature of 84°C of the solvent mixture comprising water and ethanol. The resulting dispersion had a particle size in the range of 0.05 to 5 μm (50 to 500 nm) (cf. page 29, line 3 to page 31, line 19).

3.2 Document D3

Claim 1 of this document relates to a polymerisation

process in which at least one ethylenically unsaturated monomer is emulsified in water and is polymerised in the presence of (a) a redox-type polymerisation initiator system comprising hydrogen peroxide in combination with a non-ionic water-soluble activator compound, (b) 0.5% to 10% by weight of the monomer to be polymerised of a conventional non-ionic surfactant and (c) 0.5 to 20% by weight of the monomer to be polymerised of a precursor compound the molecule of which consists of (i) a polyethylene glycol chain which has a molecular weight of 500 to 4,000 and (ii) attached to said chain at least one unsaturated grouping selected from the group consisting of methacrylate and allyl.

The polyethylene glycol chain of the precursor compound provides a steric barrier around the resulting polymer particles whereby flocculation of the latter is prevented (cf. column 3, line 61 to column 4, line 3).

According to column 8, lines 48 to 54 it is possible by virtue of the special redox-type initiator system to carry out the polymerisation at temperatures that in most cases will not need to exceed 50°C, a temperature that is employed in all the worked Examples (cf. column 10, lines 5 to 19; Examples).

While D3 envisages the preparation of latices having a low particle size (cf. column 3, lines 15 to 25), the lowest particle size disclosed is that achieved according to Example 18, namely 111 nm (cf. column 23, line 24 to column 24, line 8; especially the sentence bridging these columns).

3.3 Document D8

This document relates to aqueous dispersions of particles of an interpolymer in which at least 95% of the particles have diameters of 0.1 to 0.01 μm (100 to 10 nm), the interpolymer *inter alia* comprising 20 to 99% of methyl methacrylate and an unsaturated acid from the group of (meth)acrylic, maleic and itaconic acid. To the dispersions which result from the polymerisation process a swelling agent is added in order to aid in the subsequent comminution of the polymer particles by vigorous agitation to the desired diameters of less than 0.1 μm (100 nm) (cf. column 1, Abstract of the Disclosure).

4. Novelty

4.1 Document D2

4.1.1 Claim 1

The subject-matter of this claim is novel over D2, because this document does not disclose polymer particles having a maximum average diameter of 100 nm and having all the other features required by that claim.

Even if, contrary to the Board's judgment, the Appellant's argument was accepted that the information on page 27, lines 5 to 11 of D2, ie that the largest particles may be up to ten times the diameter of the smallest, could be combined with the lower limit of 0.01 μm (10 nm) of the particle size according to Claim 1 of this document (establishing thereby a size range of from 10 to 100 nm), such a disclosure would not destroy the novelty of present Claim 1, because it would fail to comprise the further claimed feature that

the sheath portion of the particles comprises an average of 6 to 40 oxyalkylene units.

This results from the fact that there is no generic disclosure in D2 of a "solvable component A" conforming to this requirement; the reference in the passage bridging pages 14 and 15 to the possible use of a monomethyl ether of a polyethylene glycol of a molecular weight of 1000 (corresponding to about 22 ethylene oxide units) relates to special "comb" type graft copolymers whose particle size parameters are undisclosed, and the same applies to the reference to poly(ethylene) oxide as a "simple polymer of molecular weight at least 1000" on page 20, line 11 to page 21, line 3.

4.1.2 Claim 10

The subject-matter of this claim is novel over D2 already by the functional restriction to the preparation of polymer particles according to any of Claims 1 to 9 which includes the afore-discussed particle size limitation. A further distinction is that D2 does not describe that the polymerisation initiation temperature must be under 40°C, because the sentence on page 8, lines 9 to 10 that "In general, polymerisation temperatures in the range 30 to 80°C are convenient", is an isolated statement from which the combination of process features of Claim 10 with a polymerisation initiation temperature of below 40°C (ie at the lower limit of 30°C of the afore-mentioned range) cannot be inferred.

4.2 Document D3

4.2.1 Claim 1

The subject-matter of this claim is novel over D3 because this document does not disclose particles having a maximum average diameter of 100 nm. The smallest particle size explicitly disclosed in D3 is 111 nm ("Nanosizer" reading of the dispersion according to Example 18: column 23, line 24 to column 24, line 8, particularly the sentence bridging these columns).

The Appellant's argument that the disclosure of D3 implicitly comprised particle sizes below 100 nm, because the preparation methods of D3 and of the patent in suit would be identical, cannot be accepted, not least because D3 fails to disclose one of the essential features of the patent in suit, namely the use of a polymerisation initiation temperature of under 40°C (cf. point 4.2.2 below). It is self-evident to the skilled person that this temperature, which goes together with the use of an adequate initiator system, influences the reaction rate and the molecular weight of the resulting polymer and may thus have an impact also on the particle size (cf. D5: page 175, second paragraph; D2: page 22, lines 21 to 26). The Appellant's implicit contention that the differences between the polymerisation initiation temperatures of D3 and of the patent in suit could be disregarded is therefore at variance with the facts.

Moreover, Table 1 on page 3 of the Experimental Report attached to the Appellant's submission dated 8 November 2001 shows that within the range of 0.5 to 20% by weight of monomer (= pphm) of amphipathic precursor compound ("Emulgator"), which is the range specified in Claim 1 of D3, particle sizes may be obtained which are

below (dispersions (6) and (7)) or above (dispersions (8) to (11)) the particle diameter ("TG") of 100 nm. This shows that, for the achievement of an "inventive" particle size up to 100 nm, a selection of the amount of amphipathic precursor compound would be necessary which is not suggested in D3.

4.2.2 Claim 10

The subject-matter of this claim is novel over D3 because this document fails to disclose the use of a polymerisation initiation temperature of under 40°C.

The only general information concerning the polymerisation initiation temperature which is contained in D3 sets out: "The process may be performed at various temperatures, depending on the particular monomer or monomers being polymerised, the particular initiator system employed and the rate of polymerisation desired. As indicated above, the temperature chosen should not be so high that the solvatable component of the stabiliser ceases to be effectively solvated by the aqueous phase. It is, however, a feature of the use in the process of a redox-type initiator system that the polymerisation can in general be carried out at significantly lower temperatures than those required in aqueous emulsion polymerisations employing an azo-type initiator. In most cases, the temperature will not need to exceed 50°C." (cf. column 8, lines 41 to 54).

While this passage does not rule out the use of temperatures below 40°C, it is far from suggesting their use. On the contrary, the teaching that too high a temperature should be avoided in the interest of an effective solvation of the solvatable component

together with the recommendation of an upper limit of 50°C rather points to the use of higher, albeit not too high, temperatures. This assumption is confirmed by the use as polymerisation initiation temperature of 50°C in all the worked Examples (cf. column 10, lines 5 to 12).

4.3 Document D8

While this document discloses aqueous dispersions of particles having sizes below 100 nm, they are different from those of the patent in suit in that they are ionically stabilised by the presence in the polymer of carboxylic groups and do not comprise a core-sheath structure.

The subject-matter of Claim 1 and of Claim 10 of the patent in suit is therefore novel over D8.

4.4 The conclusions of novelty drawn in the afore-mentioned points 4.1 to 4.3 with respect to the subject-matter of Claims 1 and 10 extend *a fortiori* to Claims 2 to 9 which are dependent on Claim 1 and to Claims 11 to 13 which are dependent on Claim 10 as well as to the further independent Claims 14 and 15 which comprise the features of Claim 1, or, respectively, Claims 1 and Claim 10.

5. *Closest prior art*

D3 represents the most relevant prior art because it discloses sterically stabilised aqueous polymer dispersions comprising core-sheath particles whose sheath portion of polyethylene glycol derived units is covalently bound to the addition polymerised particle core wherein the particles differ from those according

to Claim 1 of the opposed patent only by the higher particle size, the nearest embodiment being the particles of Example 18 which have a size value of 111 nm (cf. points 3.2 and 4.2.1 supra).

6. *Problem and solution*

6.1 In the Board's judgment, it can be acknowledged that the problem objectively underlying the claimed invention vis-à-vis the disclosure of D3 is, in accordance with page 3, lines 23 to 28 and page 5, lines 38 to 46 of the patent specification, the provision of such sterically stabilised aqueous dispersions which exhibit an excellent rheology at high solids contents and which provide a good penetration into porous substrates and, thus, good gloss properties of coatings derived from the dispersions. Another facet of the problem is the development of a method for the preparation of such particles/dispersions.

6.2 With respect to the polymer particles of Claim 1, the afore-mentioned problem is essentially to be solved by establishing a maximum average diameter of the core-sheath particles of 100 nm. According to Claim 10 this is to be achieved by a polymerisation process which uses a polymerisation initiation temperature of under 40°C.

6.3 The Board is satisfied that the afore-mentioned technical problem (as set out in 6.1 supra) is effectively solved vis-à-vis D3 by the features of Claim 1, particularly by the smaller size of the particles which is in turn attained according to Claim 10 by the use of a lower polymerisation initiation temperature.

This conclusion is drawn on the basis of the experimental evidence referred to in the patent in suit, particularly in its Examples 1 and 14.

Example 1 (page 5, line 49 to page 6, line 36) discloses the preparation of particles of about 50 nm diameter having a core derived from methyl methacrylate and butyl acrylate and a sheath comprising on average about 10 oxyethylene units. The emulsion polymerisation was initiated by the redox system tert-butyl perbenzoate/sodium erythorbate/ferrous sulphate at a temperature of less than 6°C. The resulting 50 weight percent aqueous dispersion of these particles exhibited the following viscosities:

shear rate [s^{-1}]	viscosity [poise]
10 to 100	10
10,000	1.1

Example 14 (page 11, line 29 to page 12, line 8) describes the preparation of an "inventive" pigmented semi-gloss composition formulated on the basis of the dispersion according to Example 3 having a solids contents of 51% by weight (cf. page 7, lines 9 to 26). According to page 12, lines 3 to 8 the resulting paint coatings exhibited *inter alia* an "improved opacity", provided a "richer fuller finish" and offered "good brush, roller and spray application with good flowout of imperfections such as brush marks".

These results show that "inventive" dispersions having high solids contents provide rheological properties which allow, without the addition of any rheology-

modifying agents, and thus in a very efficient manner the preparation of semi-gloss, opaque coatings exhibiting a smooth, defect-free surface appearance.

7. *Obviousness*

7.1 Claim 1

This issue turns on the question of whether the state of the art contains any information from which the skilled person is able to foresee that the aforementioned beneficial results can be obtained by the provision of sterically stabilised polymer dispersions whose particles have a size which is lower than according to D3, ie have a maximum average diameter of 100 nm.

7.1.1 In the Board's judgement, the subject-matter of Claim 1 is non-obvious with respect to the available citations for the following reasons:

- (i) As set out in point 4.2.1 supra, document D3 itself does not disclose nor suggest dispersions of particles whose diameter is within the range specified in present Claim 1.
- (ii) Although the Appellant is correct in pointing out that document D8 emphasizes a number of advantageous properties of aqueous polymer dispersions having a particle size in the range from 10 to 100 nm (cf. point 3.3 supra), among which their improved brush-levelling, their favourable viscosity-shear rate relationship and the glossy or semi-glossy surface appearance of coating films derived therefrom, these dispersions are fundamentally different from those of

the patent in suit in that they are ionically stabilised and do not comprise a solvatable core-sheath structure which lends itself to sterical stabilisation.

Since it is evident from common general knowledge that rheological properties of dispersions are subject to a complex interrelation of parameters, including, in a prominent position, any possible interaction between the dispersant medium (here water) and the dispersed particles, the skilled person would not assume that the change of an ionically to a sterically stabilised system would **not** affect the rheological and other properties. This results from the fact that ionic stabilisation is predominantly governed by the electrostatic forces exerted by the charged polymer molecules whereas steric stabilisation, as it is present according to D3 and according to the patent in suit, is mainly an issue of hydrogen bridge type attraction/bonds between the dispersant water and the hydrophilic moieties of the particles' sheath. This essential difference is reflected by the insensitivity of sterically stabilised dispersions towards pH changes and the presence of electrolytes which do, of course, alter and disturb the electrostatic environment of ionically stabilised dispersions (cf. page 3, lines 19 to 22 and page 4, lines 38 to 44 of the patent specification).

The skilled person would not, therefore, expect that sterically stabilised dispersions according to D3 would exhibit the same beneficial rheological properties as the ionically stabilised dispersions of D8, if their particle size would be reduced to the same range of values (ie 10 to 100 nm).

- (iii) The non-obviousness of the transfer of the particle size teaching of D8 to the sterically stabilised dispersions of D3 is also conspicuous from the time lapse between these two documents: If the Appellant's argument was right one would expect that the authors of D3, which enjoys a priority of September 1983, would have taken account of this teaching of D8, which had been published 10 years earlier in June 1973.

- (iv) Nor is the Appellant's alternative argument convincing, that the rheological properties of dispersions of the claimed particles were not improved over those according to D3 with the consequence that this property was to be disregarded for the assessment of obviousness.

This reasoning was based on the evidence submitted by the Appellant in the Experimental Report attached to its letter dated 8 November 2001 which allegedly showed that the rheological behaviour of "inventive" dispersions was worse than that of "comparative" dispersions whose particles have diameters above 100 nm (as according to D3). However, these experiments have all been carried out according to the method of Example 1 of the patent in suit and not according to the method as disclosed in the closest prior art document D3, especially not in accordance with the most relevant embodiment therein, ie Example 18, which used a different polymerisation initiator and a higher temperature of 50°C.

The results of this Experimental Report must, therefore, be disregarded because its "comparative" experiments fail to represent embodiments of the state of the art and because there is no further evidence on

whose basis it could be concluded that, in contrast to the skilled person's expectation that the different initiator and the higher polymerisation initiation temperature will indeed affect the particle size (cf. point 4.2.1 supra), these different reaction conditions have no impact on the properties of the resulting dispersions.

- (v) Even if, arguably, the achievement of polymer particles of core-sheath structure having a maximum average diameter of 100 nm, which are suitable for the preparation of stable aqueous dispersions, was considered as a recognized desideratum, their inventiveness would nonetheless result from the non-obviousness of the method for their preparation according to Claim 10, which for the first time provides the means for accomplishing this aim (cf. subsequent point 7.2; T 0595/90, OJ EPO 1994, 695: Reasons 5, last paragraph; T 0233/93 of 28 October 1996 (not published in the OJ EPO): Reasons 4, first paragraph).

7.2 Claim 10

This issue turns on the question whether the state of the art contains any information from which the skilled person is able to foresee that the solution of this aspect of the existing technical problem, ie the provision of polymer particles having a maximum average diameter of 100 nm (cf. point 6.1 supra), can be achieved by employing a polymerisation initiation temperature of under 40°C.

- 7.2.1 As set out in point 4.2.2 supra, document D3 itself is silent about the use of a polymerisation initiation

temperature in that range and contains no suggestion in that direction.

7.2.2 Nor is the Appellant's case supported by skilled person's awareness of the feasibility of polymerisation initiation temperatures of below 50°C in combination with the use of redox initiator systems (cf. D9 (post-published but relied on as expert evidence): page 320, left hand column, last sentence of second paragraph; D1: column 5, lines 51 to 59) because neither could the skilled person expect that lower polymerisation initiation temperatures would result in smaller particles, nor that dispersions containing such particles would exhibit an improved rheology.

7.2.3 Similarly, nothing can be gained for the Appellant's case from D8 because there the small particle size is not achieved by a modification of the polymerisation conditions, let alone of the polymerisation initiation temperature, but by mechanical post-treatment of the dispersion (cf. step (B) of Claim 1).

7.2.4 The Appellant, thus, failed to establish that the subject-matter of Claim 10 was obvious.

7.3 In view of the non-obviousness of the subject-matter of Claims 1 and 10, the dispersion according to Claim 14 and the coating composition according to Claim 15 are likewise non-obvious because these embodiments comprise the features of Claim 1, or, respectively, of Claims 1 and Claim 10.

7.4 The same applies to the subject-matter of Claims 2 to 9 which are dependent on Claim 1 and to the subject-matter of Claims 11 to 13 which are dependent on

Claim 10.

Order

For these reasons it is decided that:

The appeal is dismissed.

The Registrar:

The Chairman:

E. Görgmaier

R. Young