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D E C I S I O N
of 5 May 2004

Case Number: T 0975/01 - 3.3.1

Application Number: 97106254.2

Publication Number: 0805188

IPC: C09B 48/00

Language of the proceedings: EN

Title of invention:

Incorporation of aromatic polycyclic compounds during
quinacridone preparation processes

Applicant:

Sun Chemical Corporation

Opponent:

-

Headword:

Quinacridone/SUN CHEMICAL

Relevant legal provisions:

EPC Art. 56, 83, 123(2)

Keyword:

"Sufficiency of disclosure (yes) - after amendment"

"Inventive step (yes) - deterrent - not obvious solution"

Decisions cited:

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Catchword:

-



Case Number: T 0975/01 - 3.3.1

D E C I S I O N
of the Technical Board of Appeal 3.3.1
of 5 May 2004

Appellant: Sun Chemical Corporation
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Decision under appeal: Decision of the Examining Division of the
European Patent Office posted 2 April 2001
refusing European application No. 97106254.2
pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: J. M. Jonk
Members: R. Freimuth
J. H. Van Moer

Summary of Facts and Submissions

- I. The appeal lodged on 25 April 2001 lies from the decision of the Examining Division posted on 2 April 2001 refusing European patent application No. 97 106 254.2 (European publication No. 805 188).
- II. The decision under appeal was based on original claims 1 to 14 according to the then pending request submitted on 15 June 2000. The Examining Division found that the subject-matter claimed lacked sufficient disclosure (Article 83 EPC) and inventive step (Article 56 EPC) in view of document

(1) DE-B-1 151 081

The Examining Division based the objection of insufficient disclosure on the term "derivative" comprised in claim 1 of the then pending request since this term included not only any substituent but also any chemical modification of the dihydroterephthalic acid, thus leading to a large number of compounds without making available their preparation. In respect of inventive step the Examining Division held that document (1) represented the closest state of the art. The problem underlying the application was the provision of a process for the preparation of quinacridone pigments being deeper and brighter with improved transparency and rheological properties. However, comparative test showing an effect over the closest prior art, here document (1), were missing. Therefore the problem underlying the application would be considered in providing an alternative process to the one disclosed in that document. Although the amount

of the aromatic polycyclic compounds used in all the examples of document (1) was higher than the amount claimed in the application, the content of that document could not be limited to its examples. Since the amount of the aromatic polycyclic compounds was not limited in document (1) the specific amount claimed was a mere arbitrary selection without involving an inventive step.

- III. The Appellant (Applicant) argued that the claimed invention was not obvious. Starting from document (1) as closest prior art the problem was seen in providing a further process for the preparation of quinacridone pigments. This document taught to use 1 to 15 parts by weight, corresponding to 60% to 90% by weight, of an aromatic polycyclic compound based on 2,5-dianilinoterephthalic acid. Document (1) did not give any suggestion or incentive to use the aromatic polycyclic compound in a substantially smaller amount, in particular in an amount of 0.1% to 15% by weight as claimed. Therefore the process of claim 1 was inventive.
- IV. On 19 April 2004 the Appellant submitted a fresh set of 14 claims in order to remove the deficiencies under Article 83 EPC of the claims then on file. Fresh claim 1 read as follows.

"1. A process for the preparation of quinacridone pigments comprising

(a) heating, at a temperature of 80°C to 145°C, a reaction mixture comprising

(i) 2,5-dianilinoterephthalic acid or a 2,5-dianilino-6,13-dihydroterephthalic acid ester, both optionally having one or more

- substituents in at least one aniline ring,
or a mixture thereof,
- (ii) 3 to 15 parts by weight, per part of component (a)(i), of a dehydrating agent, and
 - (iii) 0.1 to 15 percent by weight, based on component (a)(i), of one or more non-pigmentary aromatic polycyclic compounds and/or derivatives thereof, with the proviso that if component (a)(i) is a 2,5-dianilino-6,13-dihydroterephthalic acid ester as defined above, reaction step (a) additionally comprises an oxidation step;
- (b) drowning the reaction mixture from step (a) by adding said reaction mixture to 3 to 15 parts by weight, per part of component (a)(i), of a liquid in which the quinacridone pigment is substantially insoluble;
 - (c) isolating the quinacridone pigment;
 - (d) optionally, conditioning the quinacridone pigment; and
 - (e) optionally, blending the quinacridone pigment with one or more quinacridone derivatives."

V. The Appellant requested that the decision under appeal be set aside and a patent be granted on the basis of claims 1 to 14 submitted on 19 April 2004, and subsidiarily that oral proceedings be appointed.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments (Article 123(2) EPC)*

Amended claim 1 specifies four alternative compounds as component (a)(i), namely 2,5-dianilinoterephthalic acid, a 2,5-dianilino-6,13-dihydroterephthalic acid ester, a particularly substituted 2,5-dianilino-6,13-dihydroterephthalic acid ester and a particularly substituted 2,5-dianilinoterephthalic acid. While the first three alternatives are found in original claim 1, the last alternative is disclosed on page 5, lines 23 to 25 of the application as filed. The language of the proviso has been adapted to that amendment.

For these reasons, the Board concludes that amended claim 1 meets the requirements of Article 123(2) EPC.

3. *Sufficiency of disclosure (Article 83 EPC)*

The objection of insufficient disclosure raised by the Examining Division in the decision under appeal has been based exclusively on the term "derivative" comprised in component (a)(i) and the proviso of the then pending claim 1. However, the amendment made to present claim 1, in particular by deleting the term "derivative" in both parts objected to of the claim, has the effect that the reason given in the decision under appeal for objecting to insufficient disclosure of the application in suit no longer applies.

Thus, the Board is satisfied that the application discloses the invention in a manner sufficiently clear and complete to be carried out by a skilled person thereby complying with the provisions of Article 83 EPC.

4. *Inventive step*

It remains to decide whether or not the subject-matter of the claims as amended involves an inventive step.

- 4.1 The present application is directed to a process for preparing quinacridone pigments by heating 2,5-dianilinoterephthalic acids in the presence of a dehydrating agent and a non-pigmentary aromatic polycyclic compound, precipitating the quinacridone pigments by addition to a non-solvent and finally isolating the pigments.

A similar process already belongs to the state of the art in that document (1) discloses in its claim 1 a process for preparing quinacridone pigments by heating 2,5-dianilinoterephthalic acids in the presence of sulfur trioxide, which is a dehydrating agent in the sense of the present application, and of an aromatic compound having up to three rings, such as naphthalene (column 4, lines 17 and 42; examples 1 to 4), which is a non-pigmentary aromatic polycyclic compound in the sense of the present application. The reaction mixture of the dehydrating agent and the non-pigmentary aromatic polycyclic compound is used in an amount of 1 to 15 parts by weight, corresponding to an amount of 60% to 900% by weight of the non-pigmentary aromatic polycyclic compound *per se*, based on 2,5-dianilinoterephthalic acid (column 4, lines 40 to 48). The quinacridone pigment is precipitated by addition to the non-solvent water and then isolated (example 2).

For these reasons, the Board considers, in agreement with the Examining Division and the Appellant, that the disclosure of document (1) specified above represents the closest state of the art and, hence, the starting point in the assessment of inventive step.

- 4.2 In view of this state of the art, the problem underlying the present application as submitted by the Appellant in appeal proceedings consists in providing a further process for preparing quinacridone pigments.
- 4.3 As the solution to this problem, the present application proposes a process as defined in claim 1 which is characterised by using 0.1 to 15% by weight, based on 2,5-dianilino-terephthalic acid, of a non-pigmentary aromatic polycyclic compound.
- 4.4 The specification of the present application demonstrates in examples 1 to 11 that the claimed process yields quinacridone pigments. This finding has never been challenged in the proceedings. Thus, the Board is satisfied that the problem underlying the present application has been successfully solved.
- 4.5 Finally it remains to be decided whether or not the proposed solution to the problem as defined in point 4.2 above is obvious in view of the prior art cited.

Document (1), i.e. the closest prior document (see point 4.1. above), teaches to use the reaction mixture of the non-pigmentary aromatic polycyclic compound at a mandatory amount of 1 to 15 parts by weight, corresponding to an amount of 60% to 900% by weight of

the non-pigmentary aromatic polycyclic compound *per se*, based on 2,5-dianilino-terephthalic acid (column 4, line 45) in that particular process for preparing quinacridone pigments. That document does not give any hint or even incentive to modify this process by reducing the amount of the non-pigmentary aromatic polycyclic compound to the substantially smaller amount claimed of 0.1 to 15% by weight in order to provide a further preparation process for quinacridones. Thus, document (1), on its own, does not render obvious the solution proposed by the claimed invention.

Furthermore, document (1) indicates at column 4, line 46 specifically that the process is preferably carried out in the presence of 5 to 10 parts by weight of the reaction mixture of the non-pigmentary aromatic polycyclic compound, corresponding to an amount of 300% to 600% by weight of the non-pigmentary aromatic polycyclic compound *per se*. Thus, this preferred teaching advises the skilled person against performing the process at such rather minor amounts of non-pigmentary aromatic polycyclic compounds as now claimed, i.e. at an amount of 0.1 to 15 % by weight.

For these reasons, the Board concludes that the person skilled in the art would have been deterred from contemplating to reduce the amount of non-pigmentary aromatic polycyclic compounds down to the range now claimed. The skilled person, hence, was discouraged from investigating that route as appearing unpromising when trying to solve the problem underlying the invention as defined in point 4.2 above. It follows that reducing the amount of non-pigmentary aromatic polycyclic compounds to the range of 0.1 to 15 % by

weight, which is indeed the solution proposed by the claimed invention, cannot be regarded as obvious.

4.6 The Examining Division not relying on further documents in the decision under appeal in order to challenge obviousness, the Board is, thus, satisfied that the state of the art addressed so far in the proceedings does not render the claimed invention obvious.

5. For these reasons, the Board concludes that the subject-matter of claim 1, and by the same token, that of dependent claims 2 to 14 involve an inventive step within the meaning of Articles 52(1) and 56 EPC.

6. Since the Appellant's request succeeds there is no need for the Board to consider its subsidiary request for 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 first instance with the order to grant a patent on the basis of claims 1 to 14 as submitted on 19 April 2004 and a description yet to be adapted.

The Registrar:

The Chairman:

N. Maslin

J. Jonk