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Datasheet for the decision of 13 June 2013

Case Number: T 0361/12 - 3.3.05

Application Number: 01986965.0

Publication Number: 1315682

IPC: C03C 17/245, C03C 17/27, C03C 17/34

Language of the proceedings: EN

Title of invention:
Methods of obtaining photoactive coatings and/or anatase crystalline phase of titanium oxides and articles made thereby

Patent Proprietor:
PPG Industries Ohio, Inc.

Opponent:
SAINT-GOBAIN GLASS FRANCE

Headword:
-

Relevant legal provisions:
EPC Art. 83
EPC R. 80

Keyword:
"Sufficiency of disclosure: no - lack of guidance"
"Third auxiliary request: not admitted - amendment not occasioned by the ground for opposition"

Decisions cited:
T 0435/91, T 1625/09

Catchword:
-

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 0361/12 - 3.3.05

D E C I S I O N
of the Technical Board of Appeal 3.3.05
of 13 June 2013

Appellant: (Opponent)
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Decision under appeal:
Decision of the Opposition Division of the European Patent Office posted 3 February 2012 rejecting the opposition filed against European patent No. 1315682 pursuant to Article 101(2) EPC.

Composition of the Board:

Chairman: G. Raths
Members: G. Glod
C. Vallet

Summary of Facts and Submissions

I. The present appeal lies from the decision of the opposition division to reject the opposition against patent EP-B-1 315 682.

The opposition division considered that the subject-matter of claims 1 to 24 of the patent as granted was unambiguously derivable from the original patent application, sufficiently clear and complete to be carried out by a person skilled in the art and novel and involved an inventive step.

The opponent's (hereafter: the appellant) notice of appeal and the grounds of appeal were received by letters dated 17 February 2012 and 5 May 2012, respectively.

II. By letter received on 29 December 2012, the patent proprietor (hereafter: the respondent) submitted its comments on the appeal.

III. On 12 February 2013 the parties were summoned to oral proceedings scheduled for 13 June 2013. A provisional non-binding opinion of the Board was attached to the summons. Therein the Board indicated that claim 1 of the patent-in-suit did not seem unambiguously derivable from the original application. In addition, it was questioned whether there was enough guidance to obtain a desired crystalline phase of TiO_2. Furthermore, the Board indicated that issues relating to novelty and inventive step would be discussed.

IV. By letter of 27 March 2013 the appellant made further submissions.

V. On 7 May 2013 the respondent filed a new main and two auxiliary requests.

VI. Oral proceedings took place on 13 June 2013. During the oral proceedings the patent proprietor submitted a new main and first to third auxiliary requests. Objections under Article 123(2) EPC and 83 EPC were raised by the appellant against the main and first and second auxiliary requests. In addition, the appellant raised objections under Articles 123(2) EPC and 84 EPC and Rule 80 EPC against the third auxiliary request.

VII. Claim 1 of the main request reads as follows:

"1. An article, comprising

- *a substrate;*
- *a first coating layer having cubic crystalline phase of zirconium oxide over at least a portion of the substrate surface; and*
- *a second coating layer of a photoactive material being titanium dioxide on the first coating layer."*

Claim 1 of the first auxiliary request has been limited by the feature:
"wherein the zirconium oxide layer has a thickness of 10 Å to 200 Å"

Claim 1 of the second auxiliary request has been limited by the feature:

"wherein the zirconium oxide layer has a thickness of 40 Å to 80 Å"

Claim 1 of the third auxiliary request reads as follows:

"1. An article, comprising

- *a substrate;*
- *a first coating layer having cubic crystalline phase of zirconium oxide over at least a portion of the substrate surface wherein the zirconium oxide layer has a thickness of 60 Å to 80 Å; and*
- *a second coating layer of a photoactive material being titanium dioxide on the first coating layer, wherein the second coating layer has a thickness of 200 Å to 400 Å."*

In addition dependent claim 3 of the second auxiliary request (corresponding to claim 18 of the patent in suit) was deleted.

VIII. The appellant's arguments relevant to the present decision can be summarised as follows:

The patent contained no clear guidance as to how to obtain cubic zirconium dioxide for all different thicknesses of the first coating layer. It was true that there were numerous examples in the patent in suit that could probably be reworked, but the examples would be partly contradictory, so that the skilled person would not know what to do to make sure that cubic zirconium oxide was obtained. The skilled person would have to conduct his own research program to arrive at the desired cubic zirconium oxide with the specified

thickness. In addition, the examples of the patent in suit only related to a glass substrate.

The third auxiliary request was not admissible under Rule 80 EPC since the deletion of a dependent claim, in this case dependent claim 3 of the second auxiliary request (corresponding to claim 18 of the patent in suit), was not occasioned by a ground of opposition.

IX. The respondent's arguments can be summarised as follows:

The patent in suit contained numerous examples and the appellant had not shown that these examples could not be reworked. Some of the examples illustrated the claimed subject-matter, so that the skilled person would know how to manufacture an article according to claim 1.

Some experimentation by the skilled person to arrive at the claimed article was acceptable and did not constitute an undue burden.

The claims of the third auxiliary request could not really be considered as a surprise. The deletion of claim 3 of the second auxiliary request (corresponding to claim 18 of the patent in suit) had been done in the light of a possible discussion on inventive step and, especially, on the amorphous phase of titanium dioxide.

X. Requests:

The appellant requested that the decision of the opposition division be set aside, and that the patent in suit be revoked.

The respondent requested that the patent be maintained on the basis of the main request or first, second or third auxiliary request as filed during the oral proceedings of 13 June 2013.

Reasons for the Decision

1. Article 83 EPC - main request

1.1 The invention relates to an article comprising a substrate, a first coating layer and a second coating layer. The first coating layer has a cubic crystalline phase of zirconium oxide. The question under debate was whether the skilled person was able to produce such a first coating layer over the whole scope of the claim by relying on his general knowledge and the information provided in the patent in suit.

1.2 It is established jurisprudence of the Boards of Appeal that the requirements of sufficiency of disclosure are met only if the invention as defined in the claims can be performed by a person skilled in the art **in the whole area claimed without undue burden**, using common general knowledge and having regard to further information given in the patent in suit (see T 435/91, point 2.2.1 of the reasons).

In other words, if, in the patent in suit, gaps of information and/or a lack of guidance can be identified, there is insufficiency of disclosure.

1.3 In the present case, the patent in suit discloses numerous examples of coated glass substrates having a zirconium oxide layer. Examples 6-11, 18, 33-37, 39-44, 50, 52, 54, 56, 58 and 61 illustrate for instance coated glass substrates having a zirconium oxide layer with a thickness of up to 77 Å and a titanium dioxide layer. Among the coated glass substrates of these examples, several do not have a cubic crystalline phase of zirconium oxide (see examples 6-10, 50, 52, 54) or have only small amounts of cubic crystalline phase of zirconium oxide (see examples 58 and 61). In addition, example 33 is presented as a reference example.

1.4 According to the description of the patent in suit, all the samples were prepared by sputter deposition (see paragraphs [0035] and [0036]). Samples 6-10 are labelled as comparative and no zirconium oxide in the cubic crystalline phase was obtained for those samples, although the process used for the preparation of these samples is very similar to the one described for sample 11 in which cubic crystalline phase of zirconium oxide was obtained. The only apparent difference is the thickness of the zirconium oxide film (65 Å in sample 11 compared to 45 Å in samples 9 and 10, 31 Å in sample 8 and 20 Å in samples 6-7). The skilled person would deduce from the results of these samples that a cubic crystalline phase of zirconium oxide cannot be obtained at a thickness of 45 Å and below.

The results of sample 9 are not clearly erroneous, since only in Table I (last column) were counts indicated for zirconium oxide in the cubic crystalline phase, while in the description (see page 9, line 46), in Table I (ninth column) and in Table II (last

column), the absence of zirconium oxide in the cubic crystalline phase was reported.

1.5 In samples 50 and 52 too, having a zirconium oxide layer thickness of 73 Å and 59 Å respectively, no cubic crystalline phase of zirconium oxide was obtained. According to the respondent's arguments this was because the postheat temperature was too low.

However, the postheat temperature cannot be the only reason for not obtaining the cubic crystalline phase of zirconium oxide, since in sample 54 having a zirconium oxide layer thickness of 48 Å no cubic crystalline phase of zirconium oxide was obtained although the postheat temperature was up to 636°C. Even for sample 61 (zirconium oxide layer thickness of 65 Å) only a little zirconium oxide in the cubic crystalline phase was obtained although the postheat temperature was up to 636°C.

In addition, no difference in amount of cubic crystalline phase can be seen for sample 61 when comparing postheat temperatures of 598°C and 636°C. This comparison corroborates the conclusion that more heating does not necessarily imply more cubic crystallinity of zirconium oxide (see also example 57).

1.6 It may be that the skilled person can guess from all the examples present in the patent in suit that the combination of the thickness of the first coating layer (or possibly of the first and the second coating layers), the preheat temperature, the postheat temperature, the power, the number of passes and the gas atmosphere in the chamber are key process

conditions when trying to obtain the desired zirconium oxide. But the skilled person cannot deduce from the examples which specific combination of these process conditions ensures that zirconium oxide in the cubic crystalline phase is obtained for zirconium oxide layer thicknesses below 57 Å (example 44). Actually, in the patent in suit there is no example having a cubic crystalline phase and zirconium oxide layer thickness lower than 57 Å.

The Board concludes that there is a gap of information concerning the key process conditions needed for obtaining the cubic crystalline phase of zirconium oxide with a zirconium oxide layer thickness below 57 Å.

1.7 It needs to be established whether this gap of information can be overcome by information present in the general part of the description or by the skilled person's general knowledge.

The description does not contain any guidance with respect to process conditions ensuring that zirconium oxide in the cubic crystalline phase is always obtained during the preparation of the article according to claim 1. The deposition of zirconium oxide on the substrate is described in general terms in paragraph [0028] of the patent in suit, but there is no mention of the cubic crystalline phase. Nor does paragraph [0036] contain any guidance with respect to process conditions that ensure that a cubic crystalline phase of zirconium oxide is obtained. Said paragraph rather describes the conditions used for the preparation of the samples. Further, reference is made to the x-ray

diffraction technique in order to determine whether a certain crystalline phase was present or not. Said paragraph however does not guide the skilled person towards conditions which necessarily lead to a cubic crystalline phase of zirconium oxide.

The teaching of said paragraph can be summarised as providing some details on process conditions and as inviting the skilled person to check what he gets.

1.8 As to the presentation of the experimental results in the patent in suit, it is true that the absence of a peak does not imply that zirconium oxide is amorphous, since more sensitive techniques such as electron diffraction could be required (see page 8, lines 21-25 of the patent in suit), but there is no evidence that a cubic crystalline phase of zirconium oxide was indeed present in the samples where no such phase was detected by x-ray diffraction technique.

1.9 The Board sees nothing in the description that would provide clear guidance on how to choose the process conditions such that a cubic crystalline phase of zirconium oxide is obtained with a zirconium oxide layer thickness below 57 Å.

In addition, there is no proof on file showing that it is within the skilled person's general knowledge to choose the conditions such that a cubic crystalline phase of zirconium oxide is necessarily obtained for all layer thicknesses.

It should further be noted that all the examples in the patent in suit relate to a glass substrate, and even if

there were conditions for obtaining the cubic crystalline phase of zirconium oxide on glass for all layer thicknesses, it would still be doubtful that said conditions could be transferred to any type of substrate falling within the scope of claim 1.

1.10 The numerous and partly inconsistent examples do not provide a concept fit for generalisation that allows the skilled person to successfully obtain zirconium in the cubic crystalline phase at all thicknesses and especially at thicknesses below 57 Å.

1.11 Consequently, to carry out the claimed invention, the skilled person, **in each single case**, is faced with the problem of determining the suitable process conditions that might allow him to obtain zirconium oxide in the cubic crystalline phase at all thicknesses. However, neither the common general knowledge nor the patent in suit provides him with any information guiding him in a systematic and reliable way towards zirconium oxide in the cubic crystalline phase at all thicknesses. Thus, the skilled person does **not have at his disposal any guidance leading necessarily and directly towards success through the evaluation of failures that may occur**, so that he can only establish by trial and error in each single case whether or not particular process conditions will provide zirconium oxide in the cubic crystalline phase. That constitutes an undue burden.

1.12 Therefore, the Board concludes that there are gaps of information in the patent in suit. The patent in suit does not provide enough information to enable the skilled person to obtain zirconium oxide in the cubic

crystalline phase at all thicknesses and especially at thicknesses below 57 Å.

Therefore, the subject-matter of claim 1 of the main request does not fulfil the requirements of Article 83 EPC.

2. Article 83 EPC - first and second auxiliary requests

Claim 1 of the first auxiliary request was limited with respect to the main request by restricting the zirconium oxide layer to a thickness of 10 Å to 200 Å while claim 1 of the second auxiliary request was further limited by restricting the zirconium oxide layer to a thickness of 40 Å to 80 Å.

The findings made for the main request that the patent in suit does not provide enough information to enable the skilled person to obtain zirconium oxide in the cubic crystalline phase at all thicknesses and especially at thicknesses below 57 Å still applies to the first and second auxiliary requests, since said value and also the zirconium oxide layer thickness of samples 9 (45 Å, no cubic crystalline phase, see also 1.4), 10 (45 Å, no cubic crystalline phase) and 54 (48 Å, no cubic crystalline phase) fall within the thickness ranges of claim 1 of said requests.

Therefore, the first and second auxiliary requests also do not meet the requirements of Article 83 EPC.

3. Rule 80 EPC - third auxiliary request

3.1 Rule 80 EPC states that "*Without prejudice to Rule 138, the description, claims and drawings may be amended, provided that the amendments are occasioned by a ground for opposition under Article 100, even if that ground has not been invoked by the opponent.*"

3.2 In the present case, claim 1 of the third auxiliary request is an attempt to overcome the grounds of opposition raised by the appellant.

However, it is not apparent which ground of opposition could be overcome in the present case by deleting a dependent claim, since such a deletion does not limit the scope of claim 1.

The purpose of Rule 80 EPC is certainly not to tidy up the claims in order to improve for example the proprietor's position in contingent national proceedings. Hence, in line with the jurisprudence (see for example T 1625/09, reasons 3.4), the deletion of dependent claim 3 of the second auxiliary request (corresponding to claim 18 of the patent in suit) contravenes Rule 80 EPC.

There is no evidence on file indicating that the amendment made to claim 1 of the second auxiliary request that led to claim 1 of the third auxiliary request had an effect on the now deleted dependent claim which would have made it necessary to delete said dependent claim in order to avoid a contradiction between independent claim 1 and the dependent claim.

The third auxiliary request is therefore not admissible under Rule 80 EPC.

Order

For these reasons it is decided that:

The patent is revoked.

The Registrar The Chairman

K. Boelicke G. Raths