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**Datasheet for the decision  
of 15 October 2019**

**Case Number:** T 0936/16 - 3.4.03

**Application Number:** 01272546.1

**Publication Number:** 1347517

**IPC:** H01L33/00, C09K11/77

**Language of the proceedings:** EN

**Title of invention:**  
LIGHT EMITTING DEVICE

**Applicant:**  
TOYODA GOSEI CO., LTD.  
Tridonic Jennersdorf GmbH  
Litec GBR  
Leuchstoffwerk Breitung GMBH

**Headword:**

**Relevant legal provisions:**

EPC Art. 123(2), 97(2)  
EPC 1973 Art. 111(1)

**Keyword:**

Amendments - generalization of a specific feature - added  
subject-matter (yes)

**Decisions cited:**

T 0416/86

**Catchword:**



**Beschwerdekammern**  
**Boards of Appeal**  
**Chambres de recours**

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Case Number: T 0936/16 - 3.4.03

**D E C I S I O N**  
**of Technical Board of Appeal 3.4.03**  
**of 15 October 2019**

**Appellant:** TOYODA GOSEI CO., LTD.  
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**Appellant:** Litec GBR  
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**Appellant:** Leuchstoffwerk Breitung GMBH  
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**Representative:** Rupp, Christian  
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**Decision under appeal:** **Decision of the Examining Division of the  
European Patent Office posted on 27 November  
2015 refusing European patent application No.  
01272546.1 pursuant to Article 97(2) EPC.**

**Composition of the Board:**

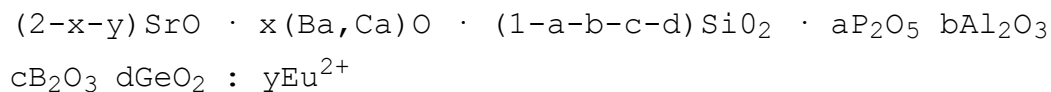
**Chairman**            G. Eliasson  
**Members:**            T. M. Häusser  
                              T. Bokor

## Summary of Facts and Submissions

- I. The appeal concerns the decision of the examining division refusing the European patent application No. 01 272 546 for added subject-matter (Article 123(2) EPC).
- II. At the oral proceedings before the board the appellants (applicants) requested that the decision under appeal be set aside and a patent be granted on the basis of claims 1-30 filed with letter dated 15 April 2013 (main request) or on the basis of claims 1-30 of the auxiliary request 1 filed with the grounds of appeal dated 24 March 2016 or on the basis of claims 1-30 of the auxiliary request 2 filed with letter dated 14 May 2019.
- III. The wording of the respective independent claim 1 of the various requests is as follows (board's labelling "(i)", "(i)'" , and "(ii)"):

Main request:

"1. A white light emitting device, comprising:  
a light emitting element comprising a nitride semiconductor; and  
a phosphor combination which can absorb a part of light emitted from said light emitting element and can emit light of wavelength different from that of said absorbed light, wherein said light emitting element is a blue light emitting diode, and wherein the phosphor combination comprises:  
a phosphor comprising divalent-europium-activated alkaline earth metal orthosilicate represented by formula:

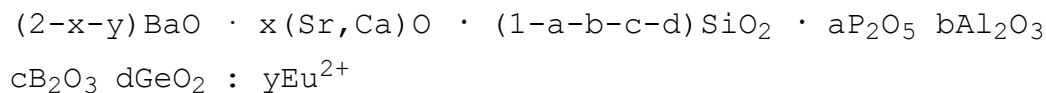


wherein  $0 < x < 1.6$ ,

$0.005 < y < 0.5$ , and

$0 \leq a, b, c$ , and  $d < 0.5$ , and/or

divalent-europium-activated alkaline earth metal orthosilicate represented by formula:



wherein  $0.01 < x < 1.6$ ,

$0.005 < y < 0.5$  and

$0 \leq a, b, c$  and  $d < 0.5$ , and

(ii) another phosphor for emitting a red light."

Auxiliary request 1:

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that (emphasis highlighting by the board)

- "divalent-europium-activated alkaline earth metal orthosilicate" is replaced on both occasions by "**a** divalent-europium-activated alkaline earth metal orthosilicate",
- "represented by formula" is replaced on the first occasion by "represented by **the** formula",
- " $0 \leq a, b, c$ " is replaced on both occasions by " $0 < a, b, c$ ", and
- the following feature (i) is added before the last feature (ii):
  - (i) "wherein at least one of the  $a, b, c$ , and  $d$  values is advantageously greater than 0.01,".

Auxiliary request 2:

Claim 1 of auxiliary request 2 differs from claim 1 of auxiliary request 1 in that (emphasis highlighting by the board)

- "represented by formula" is replaced by "represented by **the** formula" and
- feature (i) is replaced by the following feature:  
(i)' **"with the proviso that** at least one of the a, b, c, and d values is advantageously greater than 0.01,".

IV. The appellants argued essentially as follows:

Feature (ii) was directly and unambiguously derivable from the description of the application (page 4 , line 23 - page 5, line 2; page 8, lines 14-22) and therefore did not extend beyond the content of the application as filed.

## **Reasons for the Decision**

1. Main request - amendments

1.1 In its communication dated 16 April 2015, which was referred to in the contested decision being a formal decision according to the state of the file, the examining division held that feature (ii) extended beyond the content of the application as filed contrary to the provisions of Article 123(2) EPC (see points 2 and 3 of the communication).

1.2 The appellants argued that the specific phosphors for emitting red light cited in the description of the application (page 4, line 23 - page 5, line 2; page 8, lines 14-22) were merely mentioned as examples of red light emitting phosphors in general. It was evident for

the skilled person that it was the function of emitting red light which was important for achieving the desired warm white colour tone (page 2, lines 24-27; page 6, lines 10-14). On the other hand, no importance had been attached to the fact that the phosphor was selected from the cited structures. Also the fact that the expression "another phosphor" was used (page 4, lines 23-24) implied that any red light emitting phosphor could be used for the stated purpose. Hence, feature (ii) did not extend beyond the content of the application as filed.

1.3 The board notes first that an amendment is only considered to comply with the requirements of Article 123(2) EPC if it is directly and unambiguously derivable for the skilled person - using common general knowledge and seen objectively and relative to the date of filing - from the entire original disclosure (i. e. description, claims and drawings) (see *Case Law of the Boards of Appeal of the EPO*, 9th edition 2019, section II.E. 1.3.1).

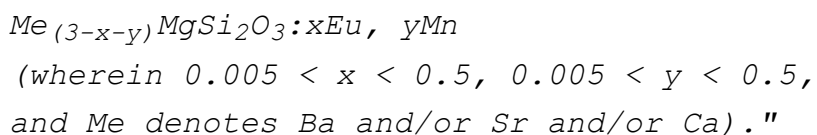
1.4 In the present case, there is no explicit disclosure of feature (ii) in the claims, description or drawings as filed. It remains to be examined whether the skilled person would derive this feature from the originally filed description, especially the passages indicated by the appellants.

1.4.1 Generally, the light emitting device of the invention comprises a nitride semiconductor light emitting element for emitting blue light and a phosphor, which absorbs part of the light emitted from the light emitting element and emits light of a different wavelength. In particular, the phosphor is a europium-activated alkaline earth metal orthosilicate emitting yellow light.



Claim 1 of the main request relates to the first embodiment of the invention according to which the light emitting device comprises a second phosphor, namely a red phosphor as specified in feature (ii). The most relevant parts of the description relating to this second phosphor - contained in the section disclosing the invention in general terms (see page 4, line 23 - page 5, line 2) and in the section disclosing the first embodiment in detail (see page 8, lines 14-22) - read as follows:

*"The light emitting device has, advantageously, another phosphor from the group of an alkaline earth metal aluminate activated by divalent europium and/or manganese, and/or  $Y(V, P, Si)O_4:Eu$  or, a further different phosphor for emitting a red light from the group of an alkaline earth metal-magnesium-disilicate [sic]:  $Eu^{2+}$ ,  $Mn^{2+}$  represented by the formula:*



*"By using one selected from the above-mentioned group of the phosphors or a combination of phosphors selected from the above-mentioned group, or a combination of a phosphor of alkaline earth metal aluminate activated by divalent europium and/or manganese, a further different phosphor to emit a red light selected from the group of  $Y(V, P, Si)O_4:Eu^{2+}$ , and a conventional phosphor selected from the group of  $Y_2O_2S:Eu^{3+}$ , an emission light color with defined color temperature and a higher color reproducibility can be obtained."*

In these passages it is explicitly disclosed that the red phosphor may be either a europium/manganese-activated alkaline earth metal-magnesium-disilicate or a europium-activated  $Y(V, P, Si)O_4$ . However, they contain no indication that other red phosphors may be used instead of these disclosed ones. In particular, the expressions "another phosphor" or "further phosphor" merely signify that a first phosphor is already present in the light emitting device and do not imply that any other phosphor may be used. Hence, the wording of these passages does not provide a basis for the generalization from the concrete red phosphors disclosed in the above passages to the "phosphor for emitting a red light" as defined in feature (ii).

- 1.4.2 The effect of this generalization is that feature (ii) specifies not only the disclosed red phosphors mentioned above, but also any other alternative phosphor for emitting red light. It remains to be considered whether the skilled person would find it evident in view of the disclosure of the application that any one of these alternative phosphors could be used in the light emitting device instead of the disclosed phosphors (cf. T 416/86, point 2.1.3 of the Reasons).

Concerning the purpose of the red phosphor the board has no reason to doubt the explanation given by the appellants that it allows the white tone to be adjusted accurately so that a warm white colour tone can be achieved. However, the skilled person would understand from the application that the red phosphor has the further function of improving the colour reproducibility, i. e. the ability of the light emitting device to reveal the colours of various objects faithfully. This is also explicitly mentioned in one of the passages cited above.

In order to be suitable for being used for the above purposes in the light emitting device of the invention, which comprises the blue light emitting element and the first yellow phosphor, a red phosphor must fulfill certain requirements. To begin with, the excitation wavelength must be adapted to the blue light emitting element so that the phosphor is able to absorb the blue light emitted from the light emitting element. Furthermore, the red phosphor also has to be adapted to the first yellow phosphor in that as little light as possible emitted from the yellow phosphor should be absorbed by the red phosphor in order not to spoil the contribution of the yellow phosphor to the overall light output. Finally, in order to qualify as a phosphor to be used in a light emitting device the red phosphor must exhibit sufficient thermal stability, so that its light output does not decrease too much with increasing temperature.

In the opinion of the board the skilled person would not expect that all red phosphors fulfill these requirements. Hence, it cannot be considered evident that any one of the alternative red phosphors could be used in the light emitting device of the invention instead of the explicitly disclosed red phosphors.

1.5 In view of the above, feature (ii) is not directly and unambiguously derivable from the application as filed. Therefore, claim 1 of the main request contains subject-matter extending beyond the content of the application as filed, contrary to the requirements of Article 123(2) EPC.

2. Auxiliary requests 1 and 2 - amendments

Claim 1 of the first and second auxiliary requests also contain feature (ii) and merely differ from claim 1 of the main request in comprising an amended definition of the first phosphor. Therefore - for the reasons stated under point 1. above - respective claim 1 of auxiliary requests 1 and 2 also contains subject-matter extending beyond the content of the application as filed, contrary to the requirements of Article 123(2) EPC.

3. Conclusion

Since none of the requests fulfills the requirements of the EPC, the board confirms the examining division's decision refusing the application. Consequently the appeal has to be dismissed (Article 97(2) EPC and Article 111(1) EPC 1973).

**Order**

**For these reasons it is decided that:**

The appeal is dismissed.

The Registrar:

The Chairman:



S. Sánchez Chiquero

G. Eliasson

Decision electronically authenticated