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Datasheet for the decision of 5 March 2013

Case Number: T 2020/09 - 3.3.09

Application Number: 00961101.3

Publication Number: 1167488

IPC: H01L 51/00

Language of the proceedings: EN

Title of invention:
Organic electroluminescent device and organic luminous medium

Patent Proprietor:
IDEMITSU KOSAN COMPANY LIMITED

Opponent:
Merck Patent GmbH

Headword:
-

Relevant legal provisions:
EPC Art. 99(1), 114(2), 123(3), 100(b), 56
EPC R. 76(2)(c)
RPBA Art. 12(4), 13(3)

Keyword:
"Admissibility of late-filed documents (no)"
"Admissibility of late-filed claim request (no, second auxiliary request)"
"Extension of scope of protection (yes, main request)"
"Sufficiency of disclosure (yes, auxiliary request)"
"Inventive step (no, auxiliary request)"

Decisions cited:
T 0271/84, T 1002/92, T 0106/97, T 1119/05, T 1029/05

Catchword:
"Applicability of the relevance criterion for the admissibility of documents newly filed with the statement of grounds of appeal (point 6 of the Reasons)"

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Beschwerdekammern | Boards of Appeal | Chambres de recours

Case Number: T 2020/09 - 3.3.09

D E C I S I O N
of the Technical Board of Appeal 3.3.09
of 5 March 2013

Appellant: (Opponent)
Merck Patent GmbH
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Respondent: (Patent Proprietor)
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Decision under appeal:
Interlocutory decision of the Opposition Division of the European Patent Office posted 7 August 2009 concerning maintenance of European patent No. 1167488 in amended form.

Composition of the Board:

Chairman: W. Sieber
Members: M. O. Müller
F. Blumer

Summary of Facts and Submissions

I. This decision concerns the appeal by the opponent against the opposition division's interlocutory decision that European patent No. 1 167 488 as amended met the requirements of the EPC.

II. An opposition was filed requesting revocation of the patent in its entirety on the grounds that the claimed subject-matter was neither novel nor inventive (Article 100(a) EPC) and that the patent did not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC).

The documents submitted during the opposition proceedings included:

D3: EP 0 857 007 A1; and

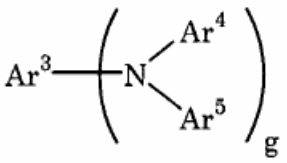
D8: G. G. Guilbault, "Practical Fluorescence - Theory, Methods, and Techniques", Marcel Dekker Inc., New York, 1973, pages 86-97.

III. The opposition division's decision, announced orally on 21 July 2009 and issued in writing on 7 August 2009, was based on a main request filed with letter of 13 August 2008.

Claim 1 of the main request read as follows:

"1. An organic light emitting medium which comprises

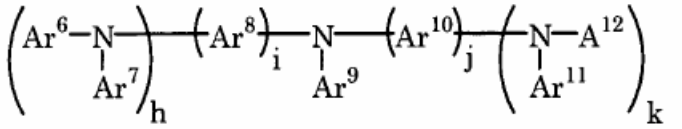
(A) at least one compound selected from the group consisting of styryl derivatives containing amine represented by general formula (III):



(III)

wherein Ar^3, Ar^4 and Ar^5 each independently represent a substituted or unsubstituted aromatic group having 6 to 40 carbon atoms, at least one of the groups represented by Ar^3, Ar^4 and Ar^5 contains styryl group, g represents an integer of 1 to 4 and the total number of styryl groups is 1 to 4; and

styryl derivatives containing amine represented by general formula (IV):

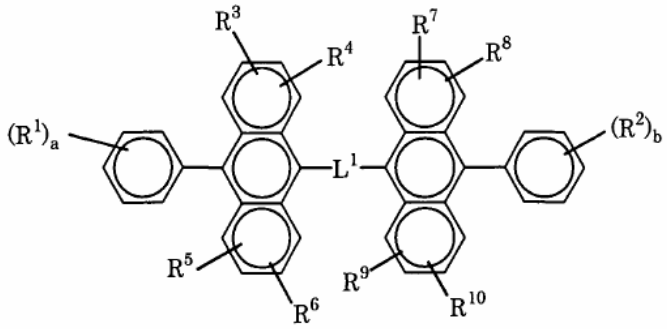


(IV)

wherein Ar^6, Ar^7, Ar^9, Ar^{11} and Ar^{12} each independently represent a substituted or unsubstituted monovalent aromatic group having 6 to 40 carbon atoms, Ar^8 and Ar^{10} each independently represent a substituted or unsubstituted divalent aromatic group having 6 to 40 carbon atoms, at least one of the groups represented by A^6 to A^{12} *[sic]* contains styryl group or styrylene group, h and k each represent an integer of 0 to 2, i and j each represent an integer of 1 or 2 and the total number of styryl groups and styrylene groups is 1 to 4, said styryl

group and styrylene group meaning a monovalent group and a divalent group, respectively, in which substituted or unsubstituted vinyl group is directly bonded to an aromatic ring group, and

(B) at least one compound selected from the group consisting of anthracene derivatives represented by general formula (I-a):



(I-a)

wherein R^1 to R^{10} each independently represent a hydrogen atom, an alkyl group, a cycloalkyl group, an aryl group which may be substituted, an alkoxy group, an aryloxy group, an alkylamino group, an arylamino group or a heterocyclic group which may be substituted; a and b reach *[sic]* represent an integer of 1 to 5; when any of a and b represents an integer of 2 or greater, a plurality of R^1 or R^2 may be the same with or different from each other and a plurality of R^1 or R^2 may be bonded to each other to form a ring; R^3 and R^4, R^5 and R^6, R^7 and R^8, and R^9 and R^{10} may be bonded to each other to form rings; and L^1 represents a single bond, -0-, -S-, -N(R)- or an arylene group, R representing an alkyl group or an aryl group which may be substituted; and

anthracene derivatives represented by general formula (II-a):

Ar^1—An—Ar^2 (II-a)

wherein An represents a substituted or unsubstituted divalent anthracene residue group and Ar^1 and Ar^2 each independently represent a substituted or unsubstituted monovalent residue group derived from naphthalene, phenanthrene, pyrene, perylene, coronene, chrysene, picene, fluorene, terphenyl, biphenyl, N-alkylcarbazole, N-arylcarbazole, triphenylene, rubicene, benzoanthracene or dibenzoanthracene, and when any of An, Ar^1 and Ar^2 has a substituent, the substituent is selected from the group consisting of alkyl groups having 1 to 6 carbon atoms, cycloalkyl groups having 3 to 6 carbon atoms, alkoxy groups having 1 to 6 carbon atoms, aryloxy groups having 5 to 18 carbon atoms, aralkyloxy groups having 7 to 18 carbon atoms, amino groups substituted with aryl groups having 5 to 16 carbon atoms, nitro group, cyano group, ester groups having 1 to 6 carbon atoms and halogen atoms."

IV. The opposition division decided not to admit *inter alia* D8 into the proceedings. As to the reasons for this decision, see point 5 below.

According to the opposition division, the invention underlying the main request was sufficiently disclosed. In the absence of any experimental proof that styryl derivatives, which fell under the definition of claim 1, did not emit light, it could not be concluded that the invention was insufficiently disclosed. The skilled person would be able to produce a light emitting medium based on the definition given in claim 1 and in view of the specific examples of the description.

Furthermore, the subject-matter of claim 1 of the main request was novel and inventive. Starting from D3 as closest prior art, in particular claim 4, the skilled person would have to make a double selection, namely a dopant out of three possibilities and an electron transporting and injecting material from a list of several hundred compounds, in order to arrive at the claimed subject-matter. There was no hint in D3 leading the skilled person to choose a particular combination of compounds. None of the explicit examples in D3 mentioned a composition of a styryl amine and anthracene derivative according to claim 1. In particular, styryl compounds (III) were coevaporated in examples 14 and 16 with AlQ3 but not with an anthracene derivative.

V. On 2 October 2009, the opponent (hereinafter: "the appellant") filed a notice of appeal against the above decision and paid the prescribed fee on the same day. The notice of appeal contained the statement of grounds of appeal together with a copy of D8 and

D11: EP 1 063 869 A1.

VI. In its reply filed with its letter of 10 February 2010, the proprietor (hereinafter "the respondent") merely referred to the arguments brought forward during the opposition proceedings.

VII. With its communication of 19 November 2012, the board communicated its preliminary opinion to the parties. The board explained that the opposition division, in exercising its discretion not to admit D8 into the proceedings appeared to have applied the right principles in a reasonable way. Furthermore, in the board's preliminary view, sufficiency of disclosure had to be acknowledged since it was at least doubtful whether the findings in D8 and D11 could be transferred to the compounds covered by claim 1. As to inventive step, the combination of the styryl and anthracene derivatives as required by claim 1 was not disclosed in D3. It had to be discussed which technical problem was solved by this specific combination and whether in view of this problem the claimed solution was obvious.

VIII. With letter of 25 January 2013, the respondent filed a reply together with

D12: US 2008/0220285 A1; and

D13: WO 2008/150872 A1.

IX. On 5 March 2013, oral proceedings were held before the board.

The respondent maintained its main request (claims as maintained by the opposition division, see point III

above) against which the appellant raised a new objection under Article 123(3) EPC.

The board having given its conclusions on the allowability of the main request, the respondent filed an "auxiliary request" (as to the amendments made in this request, see point 3. below). The admissibility of this request was not contested by the appellant.

As regards sufficiency of disclosure, the respondent maintained its request that the opposition division's decision not to admit D8 be upheld and additionally requested that D11 not be admitted into the proceedings. The appellant requested that the opposition division's decision not to admit D8 be set aside and that D11 be admitted into the proceedings.

The board having given its conclusions on the allowability of the auxiliary request, the respondent filed a "second auxiliary request", the admissibility of which was contested by the appellant (as to the amendments made in this request, see point 10.1 below).

X. So far as relevant to the present decision, the appellant's arguments can be summarized as follows:

Main request

Claim 1 of the main request did not meet the requirements of Article 123(3) EPC since it was broader than claim 1 as granted in terms of the substituents of compound (I-a).

Auxiliary request

(a) No objections were raised by the appellant as regards the requirements of Articles 123(2), 123(3), and 84 EPC.

(b) The opposition division's decision not to admit D8 into the proceedings should be set aside. D8 represented common general knowledge and common general knowledge always had to be admitted into the proceedings, as set out in T 106/97. Furthermore the opposition division's reasoning that D8 was not *prima facie* relevant was wrong.

(c) D11 should be admitted into the proceedings as it was *prima facie* relevant to sufficiency of disclosure.

(d) The invention underlying the auxiliary request lacked sufficiency of disclosure:
- Claim 1 covered styryl derivatives (III) and (IV) that could not be synthesised at the priority date of the opposed patent. Upon enquiry by the board, the appellant acknowledged that it did not have a concrete example of which compound could not be synthesised.
- As proven by D8, nitro and carbonyl substituents quenched fluorescence. Consequently, it could be concluded that compounds (III) and (IV) of claim 1 that were substituted by these substituents did not show any fluorescence and hence the invention could not be carried out over the entire scope of claim 1.

- The substituents COOH, SO_3H and OH reduced the lifetime and increased the voltage of organic light emitting devices (hereinafter referred to as "OLEDs") and hence, were not suitable for OLEDs.
- As finally proven by D11, anthracene and styryl derivatives with halogen atoms had very poor efficiencies and life times. Therefore, compounds (A) and (B) with halogen substituents as covered by claim 1 were not suitable for OLEDs.

(e) The claimed subject-matter lacked an inventive step. Closest prior art document D3 disclosed a combination of a hole transporting and injecting material, an electron transporting and injecting material and a dopant. Numerous of the styryl amine dopants (IV) of D3 corresponded to styryl amine compounds (III) and (IV) of claim 1. Furthermore, several specific compounds exemplified in D3 for the electron transporting and injecting material (E-3) corresponded to the anthracene derivatives (I-a) of claim 1. The only feature not disclosed was the combination of the two compounds. No effect was obtained by this combination such that the objective technical problem was the provision of an alternative light emitting medium. The claimed solution represented a selection of certain dopants and electron transporting and injecting materials of D3. This selection was arbitrary and hence not inventive.

The respondent's argument that the claimed subject-matter provided the advantage that only

two compounds were needed for the light emitting layer was not convincing. Claim 1 for example covered light emitting layers with three compounds so that the alleged advantage was not obtained over the entire scope of claim 1.

Second auxiliary request

The second auxiliary request should not be admitted into the proceedings. The appellant so far had never been confronted with the question whether a light emitting layer consisting of only two components was inventive. In order to deal with this issue, a new literature search would be necessary.

XI. So far as relevant to the present decision, the respondent's arguments can be summarized as follows:

Main request

Claim 2 as granted already contained the broad definition now incorporated into claim 1 of the main request. Therefore, this amendment did not lead to any broadening of the claims. The requirements of Article 123(3) EPC were therefore fulfilled.

Auxiliary request

(a) The opposition division's decision not to admit D8 should be maintained as this document lacked any *prima facie* relevance. D8 could in particular not provide any proof in the specific context of the

present invention, that nitro and carbonyl substituents led to products without any fluorescence at all. D8 was also careful in making any broad generalisations and furthermore related to solutions which were different from the claimed OLEDs.

(b) D11 should not be admitted into the proceedings as it equally lacked any *prima facie* relevance. In particular, the document only referred to halogen impurities and there was no suggestion that a halogen compound in a pure form would not work.

(c) The invention underlying the auxiliary request was sufficiently disclosed. Neither D8 nor D11 could prove the appellant's assertion that compounds with nitro, carbonyl or halogen substituents as covered by claim 1 did not work. There were even documents, such as D12 and D13 which proved that compounds with any of these substituents were suitable for OLEDs. Furthermore there was also no basis for the appellant's allegation that compounds with COOH, SO_3H or OH substituents were not suitable for use in OLEDs.

(d) The claimed subject-matter was also inventive. Even though some of the dopants disclosed in closest prior art document D3 corresponded to the styryl amine of claim 1 and a certain amount of compounds disclosed in D3 for the electron transporting and injecting material (E-3) corresponded to the anthracene derivative according to claim 1, this document did not disclose these two components in combination.

Examples 14 and 16 that applied a styryl amine according to claim 1 used AlQ3 rather than an anthracene derivative as electron transporting and injecting material. It was in fact this compound AlQ3 that was disclosed in D3 as the preferred electron transporting and injecting material. There was thus no pointer in D3 to the anthracene derivatives of claim 1 and a huge number of choices had to be made in order to arrive at the claimed combination of compounds. Furthermore, claim 1 allowed for a light emitting layer with only two compounds compared to three compounds in D3. Therefore, the claimed subject-matter was not obvious in view of this document.

Second auxiliary request

The second auxiliary request should be admitted into the proceedings. No major amendment had been effected in this request. Furthermore, there had been no need to limit the subject-matter of claim 1 until now. Finally, the disclosure in D3 of a three-component layer was so explicit that it could not be surprising to the appellant that the subject-matter of claim 1 had now been restricted to two components in order to establish inventive step.

XII. During the oral proceedings, the board made the following additional observations:

The appellant's assertion that D11 proved that halogen substituted compounds as covered by claim 1 did not work was contradicted by D11 itself, which disclosed a

specific halogen containing compound as light emitting material.

As regards the second auxiliary request, it was debatable whether the additional distinguishing feature introduced into this request was the omission of a third compound or the shifting of this compound into a separate layer.

XIII. The appellant requested that the decision under appeal be set aside and European patent No. 1167488 be revoked.

XIV. The respondent requested that the appeal be dismissed or, alternatively, that the patent be maintained on the basis of either the auxiliary request or the second auxiliary request, both filed during the oral proceedings before the board.

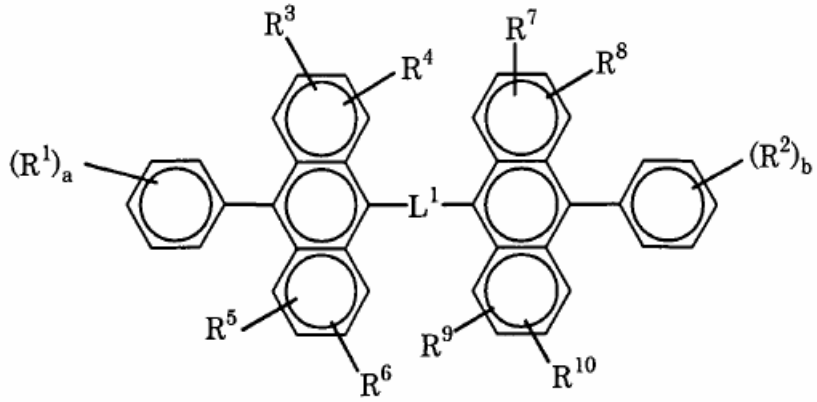
Reasons for the Decision

1. The appeal is admissible.

Main request

2. *Amendments - Article 123(3) EPC*

2.1 Claim 1 of the main request refers to an organic light emitting medium which comprises a styryl amine compound (A) and an anthracene compound (B), the latter being selected from the group consisting of *inter alia* anthracene derivatives (I-a) in which two phenylanthryl groups that are substituted by R^1 to R^{10} are linked via a linking group L^1:



(I-a)

Substituents R^1 to R^{10} can, eg, be an alkyl group without any limitation as regards the number of carbon atoms.

2.2 In the same way as in claim 1 of the main request, the anthracene compound (B) in claim 1 as granted can be an anthracene derivative A^1-L-A^2 (formula (I)) in which two phenylanthryl groups A^1 and A^2 are linked by a linking group L. The substituents (if any) of the phenylanthryl groups are selected from the group consisting of *inter alia* alkyl groups having 1 to 6 carbon atoms.

2.3 Hence, contrary to claim 1 of the main request, the carbon number of the alkyl substituents in claim 1 as granted is limited to 1 to 6 carbon atoms. The definition of the alkyl substituents in claim 1 of the main request thus is broader than that in claim 1 as granted.

2.4 The respondent argued that the definition of the alkyl substituents in claim 1 of the main request has been derived from claim 2 as granted and that therefore no broadening of the claims has occurred. It is true that in the same way as claim 1 of the main request, claim 2

as granted, as regards the anthracene derivative (I-a), refers to alkyl substituents as such, ie without any limitation of the number of carbon atoms. However, due to the dependence of granted claim 2 on granted claim 1, this limitation is also inherently present in claim 2 as granted.

Contrary thereto, claim 1 of the main request, as an independent claim, does no longer depend on any claim that restricts the number of carbon atoms of the alkyl substituents. Therefore, the inherent limitation of the number of carbon atoms of the alkyl group present in claim 2 as granted is no longer part of claim 1 of the main request.

2.5 Consequently, claim 1 of the main request is broader than both granted claims 1 and 2, which implies that it does not meet the requirements of Article 123(3) EPC. The main request is thus not allowable.

Auxiliary request

3. *Amendments - Articles 123(2), 84 and 123(3) EPC*

The respondent has adapted the definition of the substituents R^1 to R^{10} of the anthracene derivative (I-a) of claim 1 to that of claim 1 as granted. In view of this, the appellant no longer raised any objection under Article 123(3) EPC and the board is satisfied that the requirements of this article are met.

As regards the requirements of Articles 123(2) and 84 EPC, no objections were raised by the appellant either

and the board is satisfied that the requirements of these articles are also met.

4. *Admissibility of D8, D11, D12 and D13*

Documents D8, D11, D12 and D13 have been relied on by the parties in the context of sufficiency of disclosure. As the admissibility of these documents was a matter of dispute between the parties, it is necessary to first address the issue of admissibility before dealing with sufficiency of disclosure.

5. *The opposition division's decision not to admit D8*

The opposition division decided not to admit document D8 as it was filed late and did "not contain any relevant subject-matter other than the general knowledge of the skilled person". Contrary to the facts in T 106/97, D8 was not considered to be highly relevant as it "relates to fluorescent compounds in solution (p. 91, second last paragraph) and not in compositions with anthracene derivatives" and furthermore as it "only describes aromatic compounds having substituents in general, without specifying the anthracene compounds of the application".

5.1 The appellant requested that the opposition division's decision be set aside and D8 be admitted into the proceedings.

5.2 As to this request, it must first be examined whether the opposition division had a discretionary power not to admit D8. In this regard, the requirements of Article 99(1) EPC and Rule 76(2)(c) EPC in conjunction

with Article 114(2) EPC are of relevance. Article 99(1) EPC requires that an opposition shall be filed within nine months of the publication of the mention of the grant of the patent. According to Rule 76(2)(c) EPC, the notice of opposition shall *inter alia* contain an indication of the facts and evidence presented in support of the grounds of opposition.

In the present case, D8 was filed by the appellant during the opposition proceedings with letter of 23 June 2009, ie roughly one and a half years after the expiry of the nine month period according to Article 99(1) EPC. D8 thus was submitted late. It was therefore at the opposition division's discretion whether to admit document D8 (Article 114(2) EPC).

5.3 When reviewing the discretionary decision of an opposition division on a procedural matter, the board normally maintains this decision if the opposition division has exercised its discretion firstly according to the right principle(s) and secondly in a reasonable way (T 1119/05 of 8 January 2008, not published in OJ EPO, point 3.2 of the Reasons).

5.4 A second point to be addressed as regards the appellant's request is therefore whether the opposition division, in not admitting D8, applied the correct principles.

One of the principles to be applied as regards the admittance of late-filed documents is the relevance criterion, ie whether they are *prima facie* prejudicial to the maintenance of the patent in suit (T 1002/92; OJ EPO 1995, 605; point 3.3).

In considering whether D8 was highly relevant, the opposition division thus applied the correct principle when exercising its discretion as regards the admittance of D8.

5.5 It remains to be examined whether the opposition division applied the relevance criterion in a reasonable way.

5.5.1 In the appellant's opinion, D8 was highly relevant in view of the following statement:

"A simple generalization is that ortho-para-directing substituents often enhance fluorescence, whereas meta-directing groups repress it. Many of the common meta-directing substituents possess low-lying (n, π) singlets. The $-NO_2$ group is especially notorious for repressing fluorescence... In very acidic glassy solvents at 77°K many nitroaromatics fluoresce but exhibit no phosphorescence... In a similar manner carbonyl substituents (ketone, aldehyde, ester, carboxylic acid), which are meta-directing, repress fluorescence because..."* (second to fourth paragraph of page 88, emphasis added).

According to the appellant, this passage of D8 proves that nitro and carbonyl substituents quench fluorescence and that hence the nitro- and carbonyl-substituted compounds (III) and (IV) of claim 1 do not show any fluorescence. The invention could therefore not be carried out over the entire scope of claim 1 and was thus insufficiently disclosed.

5.5.2 The board does not agree with the appellant's argument. D8 can in particular not provide any proof, in the specific context of the present invention, that the substituents which are mentioned by the appellant, ie the nitro and the carbonyl group, lead to products that are covered by claim 1 and that do not show any fluorescence at all.

First of all, the specific compounds disclosed in D8 do not correspond to the styryl or anthracene compounds (A) and (B) of claim 1. The appellant itself has however acknowledged on page 7 of the grounds of appeal that even small structural modifications can lead to significant differences in electro-optical properties ("Im Gegenteil ist es allgemein bekannt, dass selbst kleine strukturelle Modifikationen zu deutlichen Unterschieden in den elektrooptischen Eigenschaften führen können"). Therefore, the findings for the specific compounds in D8 cannot be transferred to different compounds as covered by claim 1. This is in fact confirmed by D8 itself, which states several times that the findings reported in this document cannot be generalised. More particularly, it discloses in the last paragraph on page 87 that "*[T]he fluorescence yields (intensities) and energies of aromatic and heterocyclic hydrocarbons are usually altered by ring substitution*" and that "*[U]nfortunately we must be careful in making broad generalisations*." (emphasis added). In the same way, as regards the effects of *inter alia* nitro and carbonyl substituents in table 20, D8 makes "*the warning that this table must be treated only as a very general guide*" and that "*[N]umerous exceptions to almost every entry in the table have been documented, particularly in the case of*

substituent groups that can interact strongly with the solvent." (penultimate paragraph on page 91, emphasis added). Finally, in the second paragraph on page 93, D8 states that *"[T]he arguments presented here, though oversimplified, have in the past been sufficient to enable rationalization of most of the available facts concerning heterocycle luminescence"* and that *"[R]ecent experiments and theoretical studies suggest, however, that the situation may be somewhat more complicated than indicated above"*.

Furthermore, D8 seems to relate to the fluorescence of dissolved organic molecules [see the numerous references to solvents or solutes in D8: third paragraph on page 88 ("In very acidic glassy solvents ..."); fifth line from the bottom of page 88 ("... hydrogen bond with the solvent or occasionally with other solutes."); penultimate and last line of page 88 ("...interact very strongly with the solvent..."); figure 62 on page 89 ("Total emission spectra of halogenated naphthalenes in EPA at 77°K", emphasis added); lines 6-7 of page 90 ("... the "heavy atom" need not even be a constituent of the luminescent solute ..."); penultimate paragraph on page 91: ("...substituent groups that can interact strongly with the solvent..."); second paragraph of page 96 ("...their fluorescence and phosphorescence will in general extraordinarily depend on the solvent"); sentence bridging pages 96 and 97 ("Also, in carefully deoxygenated solutions in aprotic solvents, some aromatic ketones exhibit both fluorescence and thermally activated delayed fluorescence [36] in liquid solution [37].")].

Fluorescence of dissolved compounds is however a technical field different from the field of organic light emitting devices (hereinafter referred to as "OLEDs"), which are solid state objects. Also for this reason, the findings reported in D8 cannot be transferred to the embodiments covered by claim 1.

5.5.3 It was thus reasonable by the opposition division to conclude that D8 was not highly relevant. The opposition division therefore applied the right principle in a reasonable way.

5.5.4 The appellant argued that D8 was common general knowledge and thus, according to decision T 106/97 of 16 September 1999, should have been admitted into the proceedings by the opposition division.

However, T 106/97 states that "[S]ince "Alumina" is a highly relevant handbook representing general technical knowledge it cannot be disconsidered by the board as "late filed"..." (point 3.5 of the Reasons, not published in OJ EPO, emphasis added). Hence, contrary to the present case, T 106/97 was dealing with common general knowledge that was prima facie relevant. Similarly, in T 271/84 (OJ EPO 1987, 405), the board mentions in the context of the admissibility of common general knowledge the "degree of relevance" as one of the criteria to be applied (last paragraph of point 3 of the Reasons).

Therefore, since it is not *prima facie* relevant, D8 needs not be admitted into the proceedings, even though it may constitute common general knowledge.

5.6 Consequently, the board does not see any reason to set aside the opposition division's decision not to admit D8.

Furthermore, the appellant has not presented any facts or arguments which could support the admissibility of D8 in the appeals proceedings despite the correct decision of the opposition division not to admit said document in the opposition proceedings, and the board does not see any such facts or arguments. The board therefore decided not to admit D8 into the proceedings.

6. *Admissibility of D11*

6.1 D11 was filed with the appellant's grounds of appeal (letter of 2 October 2009). During the oral proceedings before the board, the respondent requested that D11 not be admitted into the proceedings.

6.2 In the same way as D8, D11 has been submitted after the expiry of the nine month period under Article 99(1) EPC and thus is filed late. In the board's view, this is not changed by the fact that D11 was filed with the statement of grounds of appeal as the provisions of Article 99(1) EPC in conjunction with Rule 76(2)(c) EPC (see point 5.2. above) also apply in appeal proceedings (Rule 100(1) EPC). It is therefore at the board's discretion whether to admit D11 into the appeal proceedings or not (Article 114(2) EPC).

As has been set out above by reference to decision T 1002/92 (point 5.4), one of the criteria to be applied as regards the admittance of a late-filed

document is whether it is *prima facie* prejudicial to the maintenance of the patent.

In the board's opinion, this relevance criterion is also to be applied to documents filed with the statement of grounds of appeal. This is confirmed by eg T 1029/05 of 12 March 2008 (not published in OJ EPO), where in the same way as in the present case, a new document D4 was filed with the statement of grounds of appeal (see point 2.5.4 of the Reasons) and where it was stated that *"... the issue of admissibility of document D4 boils down to the following questions:*

(i) as to whether the late filing of document D4 is to be seen as representing an abuse of proceedings, and, if question (i) is negatively answered,
(ii) as to whether the relevance of document D4 is *prima facie* such to justify its introduction into the proceedings." (point 2.5 of the Reasons).

6.3 As to the relevance of D11, the appellant argued that D11 proved that anthracene and styryl derivatives with halogen atoms had very poor efficiencies and life times. Therefore, halogen-substituted compounds (A) and (B) as covered by claim 1 were not suitable for OLEDs.

However, D11 only discloses that certain halogen impurities significantly attenuate emission luminance and shorten emission life (page 28, lines 39-40). D11 nowhere discloses that pure halogen-substituted compounds are devoid of fluorescence.

Moreover, there is no statement in D11 that halogen-containing anthracene and styryl derivatives in

general, let alone those according to claim 1, are devoid of fluorescence.

Finally, D11 (page 14, line 24 in conjunction with page 18, line 14) discloses, as light emitting material, an aromatic compound that contains halogen groups. So, D11 itself contradicts the appellant's assertion that any halogen-containing compound is devoid of fluorescence.

D11 is thus clearly not *prima facie* relevant.

6.4 The board therefore decided not to admit D11 into the proceedings.

7. *Admissibility of D12 and D13*

D12 and D13 were filed by the respondent with its letter of 25 January 2013 to rebut the appellant's argument that D8 and D11 proved nitro-, carbonyl- or halogen-substituted compounds as covered by claim 1 to be unsuitable for any use in OLEDs (point XI(c) above).

As the board has acknowledged that D8 and D11 cannot provide the alleged proof, even without taking D12 and D13 into account (see points 5 and 6 above), there is no need to decide on the admissibility of D12 and D13.

8. *Sufficiency of disclosure (Article 100(b) EPC)*

8.1 The appellant argued that claim 1 covers styryl derivatives of formulae (III) and (IV) that could not be synthesised at the priority date of the opposed patent.

The appellant however neither specified which concrete compounds could not be synthesized nor did it provide any evidence in this context. In fact, the appellant acknowledged during the oral proceedings before the board that it could not name any concrete compound that could not be synthesised. The appellant's argument is thus unsubstantiated and therefore must fail.

8.2 The appellant further argued that compounds containing nitro or carbonyl substituents as covered by claim 1 did not show any fluorescence and hence that the invention could not be carried out over the entire scope of claim 1.

As regards this assertion, the appellant relied exclusively on D8. As set out above, the decision of the opposition division not to admit this document must be maintained. Therefore, D8 does not form part of the present proceedings. In view of this, the appellant's assertion is unsubstantiated and therefore must fail.

8.3 The appellant additionally argued that the substituents COOH, SO_3H and OH reduced the lifetime and increased the voltage of OLEDs and hence, were not suitable for OLEDs.

However, for this assertion too, no evidence has been provided and therefore the argument based on this assertion must fail as well.

8.4 The appellant's final argument was that, as demonstrated by D11, halogen compounds reduced the lifetime of OLEDs. Since claim 1 covered halogen containing anthracene and styryl derivatives, the invention could not be carried out over the entire scope of claim 1. However, as set out above, D11 was not admitted into the proceedings. Therefore, this argument of the appellant is also unsubstantiated and hence it too must fail.

8.5 Sufficiency of disclosure of the invention underlying the auxiliary request consequently must be acknowledged.

9. *Inventive step*

9.1 The invention concerns organic electroluminescent devices and organic light emitting media which exhibit *inter alia* high efficiency and a long life (page 2, lines 5-8).

9.2 In the same way as the opposed patent, D3 refers to organic electroluminescent devices having a high luminance and a long lifetime (page 3, lines 22-29). As acknowledged by both parties, D3 therefore constitutes the closest prior art.

D3 refers to an OLED wherein the light emitting layer is in the form of a mix layer containing the following three compounds

- a hole injecting and transporting compound,
- an electron injecting and transporting compound,
- and a dopant (page 4, lines 33-36 and independent claim 4).

The electron injecting and transporting compound of D3 can have any of the general structures (E-1) to (E-14) (page 215, lines 43-44 of D3) with numerous of the specific structures given for the general structure (E-3) corresponding to the anthracene derivative (I-a) of claim 1. By way of example, reference is made to the specific structure (E-3-1) of D3 (page 254) which is composed of two phenylanthryl groups that are linked by a phenyl group and which corresponds to formula (I-a) of claim 1 with R^1 to R^{10} being hydrogen and L^1 being phenyl.

The dopant of D3 is a coumarin derivative, a quinacridone compound or a styryl amine compound of formula (IV) (page 4, lines 33-36) with numerous of the specific structures given for the styryl amine compound corresponding to the styryl amine derivative (III) or (IV) of claim 1. For instance, the specific structures (IV-1), (IV-2) and (IV-4) on page 24 of D3 correspond to compound (IV) of claim 1 and structure (IV-3) of D3 corresponds to compound (III) of claim 1.

As acknowledged by both parties, a combination of, on the one hand, an anthracene derivative satisfying formulae (I-a) or (II-a) of claim 1 with, on the other hand, a styryl amine derivative satisfying formulae (III) or (IV) of claim 1 is not disclosed in D3.

9.3 During the oral proceedings before the board, the respondent argued that the problem underlying the patent in suit in the light of D3 was the provision of a simpler organic light emitting medium. According to the respondent, this problem was solved in view of D3 by providing a medium that, instead of the three compounds of D3, contained only two compounds, namely the styryl amine and anthracene compounds (A) and (B) of claim 1.

However, claim 1 refers to an organic light emitting medium which comprises compounds (A) and (B). As acknowledged by the respondent, claim 1 therefore covers light emitting media that contain three compounds in the same way as D3, namely the anthracene and the styryl amine compounds (A) and (B) and eg an additional hole injecting or transporting material. At least for these light emitting media, the problem referred to by the respondent of providing a simpler light emitting medium, is not solved. This problem formulated by the respondent therefore cannot be the objective technical problem.

Consequently, the objective technical problem has to be formulated in a less ambitious manner as the provision of an alternative organic light emitting medium.

9.4 As a solution to this problem, the patent in suit proposes an organic light emitting medium according to claim 1 which comprises a combination of styryl amine (A) with anthracene derivative (B).

9.5 In view of the examples of the opposed patent, it is credible to the board that this problem has been solved. This was not disputed by the appellant.

9.6 It remains to be examined whether in view of this objective technical problem, the claimed solution was obvious.

9.6.1 The claimed solution represents a selection of certain styryl amines (IV) out of the list of dopants of D3 and certain anthracene derivatives out of the list of electron transporting and injecting materials of D3.

In the absence of any effects arising out of this selection, this selection is arbitrary.

Furthermore, the styryl amine derivatives selected in claim 1 are described in D3 as "illustrative examples" of the styryl amine dopant (page 23, line 12) and the anthracene derivatives selected in claim 1 are disclosed in D3 as part of "exemplary electron transporting host materials" (page 215, lines 43-44).

An arbitrary selection out of something that is described as "illustrative" and "exemplary" belongs to the routine tasks of the skilled person. Such a selection therefore cannot contribute to inventive step.

9.6.2 The respondent argued that this selection was not obvious because the electron injecting material that was preferred in D3 was tris(8-quinolato)aluminium (AlQ3), which is different from any of compounds (I-a)

and (II-a) of claim 1, and since it was this component that was used in examples 14 and 16 of D3.

It is true that D3 (page 18, lines 39-45 in conjunction with page 19, line 16, and page 215, lines 41-42) discloses AlQ3 as preferred electron transporting and injecting material. It is also correct that examples 14 and 16 apply styryl amine (IV-1) (which corresponds to styryl amine (IV) of claim 1) in combination with AlQ3 (back-reference to examples 9 and 10) as electron transporting and injecting material.

However, the teaching of a document is not restricted to its preferred embodiments or those disclosed in the examples and there is no reason why the skilled person would not choose any of the further "exemplary" and "illustrative" compounds disclosed in D3. The respondent's argument therefore must fail.

9.6.3 The respondent additionally argued that inventive step had to be acknowledged over D3 as selections were necessary from a huge number of components disclosed in this document.

It is true that D3 (pages 215-310) discloses a high number of electron transporting and injecting materials of which only some correspond to compound (I-a) of claim 1. However, the fact that the number of components from which a selection has to be made is high does not change the finding that this selection is arbitrary and hence not inventive.

9.7 The subject-matter of claim 1 of the auxiliary request therefore lacks an inventive step in view of D3.

Second auxiliary request

10. *Admissibility*

10.1 This request was filed by the respondent during the oral proceedings before the board. The request differs from the previous auxiliary request in that the organic light emitting medium in claim 1 consists of rather than comprises compounds (A) and (B).

The respondent argued that by way of this restriction, the claimed subject-matter became inventive in view of D3. More particularly, the claimed subject-matter was now restricted to light emitting media consisting of only two compounds while the light emitting medium of D3 mandatorily contained three compounds. According to the respondent, this had the advantage that the claimed light emitting medium had a simpler composition.

10.2 However, inventive step in view of D3 was already an issue in the opposition division's decision and the appellant had addressed this issue in detail in its statement of grounds of appeal. Therefore, the respondent could have made the above allegation of fact (ie the reference to the alleged advantage of a simpler light emitting layer) and could have already submitted the correspondingly restricted claims of the second auxiliary request in direct response to the statement of grounds of appeal. Rather than doing so, the respondent chose to make this submission only during the oral proceedings before the board, ie at the latest possible stage of the appeal proceedings.

10.3 The respondent's submission raises complex new issues.

It is firstly far from straightforward whether the additional distinguishing feature introduced by the restriction of claim 1 is the omission of the hole transporting and injecting material of D3, as alleged by the respondent, or simply the shifting of this material into a separate layer. In this respect it seems to be important that in the same way as D3, the examples of the opposed patent use three materials, the only difference to D3 being that one of the three materials (the hole transporting and injecting material) is present in a separate layer.

The second issue that would need a detailed analysis is which problem is solved by the additional distinguishing feature and whether the solution chosen in the claims is obvious in view of this problem. As set out by the appellant during the oral proceedings, up to now, it has never been confronted with this issue and a new literature search would be necessary.

10.4 Consequently, in order to give the appellant sufficient time to react to the respondent's second auxiliary request, the oral proceedings would have had to be adjourned. The board therefore decided not to admit the second auxiliary request into the proceedings (Article 13(3) RPBA).

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The patent is revoked.

The Registrar: The Chairman:

M. Cañueto Carbajo W. Sieber