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**Datasheet for the decision  
of 24 January 2012**

**Case Number:** T 0546/08 - 3.4.03  
**Application Number:** 04257205.7  
**Publication Number:** 1538685  
**IPC:** H01L 51/40, H01L 51/20  
**Language of the proceedings:** EN

**Title of invention:**  
OFETs with active channels formed of densified layers

**Applicant:**  
LUCENT TECHNOLOGIES INC.

**Headword:**  
-

**Relevant legal provisions (EPC 1973):**  
EPC Art. 84, 113(1)  
EPC R. 29(1)(3); 71(2)

**Relevant legal provisions:**  
RPBA Art. 15(3)(5)(6)

**Keyword:**  
"Clarity (no - main and auxiliary request)"

**Decisions cited:**  
T 0032/82, T 0602/03, T 0991/07, T 1867/07

**Catchword:**  
-



Case Number: T 0546/08 - 3.4.03

**D E C I S I O N**  
of the Technical Board of Appeal 3.4.03  
of 24 January 2012

**Appellant:** LUCENT TECHNOLOGIES INC.  
(Applicant) 600 Mountain Avenue  
Murray Hill, NJ 07974-0636 (US)

**Representative:** Sarup, David Alexander  
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**Decision under appeal:** Decision of the Examining Division of the  
European Patent Office posted 9 November 2007  
refusing European patent application  
No. 04257205.7 pursuant to Article 97(1) EPC  
1973.

**Composition of the Board:**

**Chairman:** R. Q. Bekkering  
**Members:** T. Häusser  
T. Karamanli

## Summary of Facts and Submissions

- I. The appeal concerns the decision of the examining division posted on 9 November 2007 refusing the European patent application No. 04 257 205 for lack of clarity (Article 84 EPC 1973) and lack of novelty (Article 54 EPC 1973).
- II. In a communication pursuant to Rule 100(2) EPC the board raised an objection as to lack of clarity (Article 84 EPC 1973). In response the appellant (applicant) submitted a declaration of Mr A. Maliakal dated 17 June 2011 and a new set of claims. Amended claim 1 of this new set of claims comprised the following features:
- (i) "wherein said channel comprises a densified layer of organic molecules with conjugated multiple bonds", and
  - (ii) "the densified layer of the organic molecules having a higher density than a bulk layer of the organic molecules of a same composition".
- III. The appellant was duly summoned to attend oral proceedings before the board. In the communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal of the European Patent Office (RPBA, OJ EPO 2007, 536), annexed to the summons to oral proceedings, the board made the preliminary remark that the objection as to lack of clarity raised in its earlier communication had not been overcome by the amended claims of the new set of claims.
- IV. In response to the summons to oral proceedings, with letter of 2 December 2011, the appellant requested that

the decision under appeal be set aside and that a patent be granted on the basis of amended claims according to a main request ("primary request") or auxiliary request.

V. Oral proceedings were held before the board in the absence of the appellant.

VI. The wording of claim 1 according to the main and auxiliary requests reads as follows (the features (i) and (ii) cited above, which are also present in these claims, are highlighted by the board):

Main request:

"An apparatus, comprising,  
an elastomeric substrate having a surface, said elastomeric substrate being expandable by at least 10 percent as compared to its original configuration;  
an organic field-effect transistor located adjacent said surface of said substrate, said transistor comprising a gate, a channel, a source electrode, and a drain electrode; and

**wherein said channel comprises a densified layer of organic molecules with conjugated multiple bonds, the densified layer of the organic molecules having a higher density than a bulk layer of the organic molecules of a same composition** and axes of said organic molecules being oriented substantially normal to said surface."

Auxiliary request:

"An apparatus, comprising,

an elastomeric substrate having a surface, said elastomeric substrate being expandable in a direction that is coincident with a direction of intended current flow by at least 10 percent as compared to its original configuration;

an organic field-effect transistor located adjacent said surface of said substrate, said transistor comprising a gate, a channel, a source electrode, and a drain electrode; and

**wherein said channel comprises a densified layer of organic molecules with conjugated multiple bonds, the densified layer of the organic molecules having a higher density than a bulk layer of the organic molecules of a same composition** and axes of said organic molecules being oriented substantially normal to said surface."

VII. The appellant argued essentially as follows:

Claim 1 of the main request was clear. This was supported by the declaration of Mr A. Maliakal in which it was pointed out that it was common for thin layers of a material to have different densities than bulk or thick layers of the same material. The skilled person would understand that measurements of the molecular density of a given layer and a bulk or thick layer of the same composition would enable the unambiguous determination of whether the given layer was a densified layer.

The claims according to the auxiliary request met all requirements of the EPC.

## Reasons for the Decision

### 1. Admissibility

The appeal is admissible.

### 2. Procedural matters

2.1 Claim 1 of the main request and claim 1 of the auxiliary request were submitted in response to the summons to oral proceedings before the board. The duly summoned appellant was not represented at the oral proceedings. The proceedings were however continued without the appellant in accordance with Rule 71(2) EPC 1973. In view of Article 113(1) EPC 1973, the board had to consider whether it was in a position to decide on these claims.

2.2 According to Article 15(3) RPBA, the board "shall not be obliged to delay any step in the proceedings, including its decision, by reason only of the absence at the oral proceedings of any party duly summoned who may then be treated as relying only on its written case". The purpose of oral proceedings is to give the party the opportunity to present its case and to be heard. However, a party gives up that opportunity if it does not attend the oral proceedings.

It is established case law of the boards of appeal that an appellant who submits amended claims shortly before the oral proceedings and subsequently does not attend these proceedings must expect a decision based on objections which might arise against such claims in his absence (see e.g. T 602/03, point 7 of the Reasons).

Therefore, an appellant who submits new claims after oral proceedings have been arranged but does not attend these proceedings must expect that the board decides that the new claims are not allowable because of deficiencies, such as for example lack of clarity (see e.g. T 991/07, point 2 of the Reasons; T 1867/07, point 3 of the Reasons).

- 2.3 In the present case, claim 1 of the main and auxiliary requests were found to be unclear contrary to the requirements of Article 84 EPC 1973 as detailed below. The appellant had to expect a discussion during oral proceedings on the clarity of its newly filed claims, in particular because in the communication under Article 15(1) RPBA the board had made the preliminary remark that a previously raised objection as to lack of clarity had not been overcome by the amended claims of the new set of claims. Furthermore, the features (i) and (ii) of claim 1 of the main and auxiliary requests, which are relevant in this respect, had already been present in the claim 1 on file at the time when the above communication was issued.

Due to the appellant's absence in the oral proceedings, relevant issues regarding Article 84 EPC 1973 could not be discussed with the appellant. However, a duly summoned appellant who by his own volition does not attend the oral proceedings cannot be in a more advantageous position than he would have been if he had attended. The voluntary absence of the appellant can therefore not be a reason for the board not to raise issues it would have raised if the appellant had been present.

Since the appellant did not appear in order to explain why the claims were clear, the board could only rely on the appellant's written submissions. The voluntary absence of the appellant was not a reason for delaying a decision and the board was also in a position to decide at the conclusion of the oral proceedings, since the case was ready for decision (Article 15(5) and (6) RPBA).

### 3. Clarity

#### 3.1 Main request

3.1.1 Article 84 EPC 1973 requires that the claims shall be clear and define the matter for which protection is sought. Rule 29 EPC 1973 elaborates on Article 84 EPC 1973 and stipulates that the "claims shall define the matter for which protection is sought in terms of the technical features of the invention" (Rule 29(1) EPC 1973, first sentence) and that any "claim stating the essential features of an invention may be followed by one or more claims concerning particular embodiments of that invention" (Rule 29(3) EPC 1973).

It is established case law of the boards of appeal that Article 84 EPC 1973 in combination with Rule 29(1) and (3) EPC 1973 has to be interpreted as meaning that a claim must define the object of the invention clearly, i.e. indicate all the essential features thereof. All features which are necessary for solving the technical problem with which the application is concerned have to be regarded as essential features (T 32/82, point 15 of the Reasons).



3.1.2 In the present case, the problem to be solved, as indicated in the application (page 2, paragraph 2) is to provide an organic field effect transistor (OFET) having a channel whose carrier mobility is higher than previous OFETs. This is achieved (see page 2, paragraph 3 and page 7, paragraph 3) by providing that the channel comprises a densified layer which is *physically strained parallel to the substrate surface* on which the layer is formed. The densified layer has a strain because the molecular over-density has not relaxed to a lower value that would be found in a bulk layer of the same composition, the densified layer being too thin for complete relaxation of the strain.

3.1.3 In claim 1 of the main request it is not specified that the densified layer is strained parallel to the substrate surface. It is merely specified that the densified layer of organic molecules has a higher density than a bulk layer of the organic molecules of a same composition (see the highlighted features in point VI. above). Such a difference in density could however well be due to other influences, for example surface effects. This is also in line with the declaration of Mr A. Maliakal, relied upon by the appellant, in which it is stated that it is common for thin layers of a material to have different densities than bulk or thick layers of the same material.

Furthermore, it is indicated in claim 1 that the elastomeric substrate is expandable by at least 10 percent as compared to its original configuration. This feature relates only to an intrinsic property of the elastomeric substrate, namely to the property relating to how much the substrate can be expanded. It does not

have any consequences on the other features of the apparatus, in particular the densified layer.

3.1.4 For these reasons the board is of the opinion that claim 1 of the main request does not indicate all the features which are necessary for increasing the carrier mobility, i.e. the essential features of the invention. Therefore, claim 1 of the main request lacks clarity contrary to the requirements of Article 84 EPC 1973.

### 3.2 Auxiliary request

3.2.1 Claim 1 of the auxiliary request differs from claim 1 of the main request in defining that the elastomeric substrate is expandable "in a direction that is coincident with a direction of intended current flow". The difference concerns merely an intrinsic property of the elastomeric substrate and does not affect the densified layer.

3.2.2 Accordingly, in view of the reasons given above under point 3.1 in relation to the main request, claim 1 of the auxiliary request also lacks clarity contrary to the requirements of Article 84 EPC 1973.

**Order**

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

The appeal is dismissed.

The Registrar:

The Chairman:

S. Sánchez Chiquero

R. Q. Bekkering