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Datasheet for the decision of 17 March 2016

Case Number: T 2109/14 - 3.4.02

Application Number: 04820962.1

Publication Number: 1702208

IPC: G01N27/416, G01N33/28, E21B47/10, G01N27/30, G01N27/333

Language of the proceedings: EN

Title of invention:
ELECTRO-CHEMICAL PH SENSOR

Applicant:
Schlumberger Technology B.V.
PRAD Research and Development N.V.
Schlumberger Holdings Limited
Schlumberger Oilfield Assistance Limited
Services Pétroliers Schlumberger

Relevant legal provisions:
EPC 1973 Art. 111(1)
EPC Art. 123(2)
RPBA Art. 13(1)

Keyword:

Added subject-matter - (main request: yes)
Admissibility of amended request filed during oral proceedings - (first auxiliary request: no)
Remittal for further prosecution - (second auxiliary request: yes)

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Case Number: T 2109/14 - 3.4.02

D E C I S I O N
of Technical Board of Appeal 3.4.02
of 17 March 2016

Appellants: (Applicants)

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Decision under appeal: **Decision of the Examining Division of the European Patent Office posted on 17 July 2014 refusing European patent application No. 04820962.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairwoman T. Karamanli
Members: F. J. Narganes-Quijano
H. von Gronau

Summary of Facts and Submissions

I. The appellants (applicants) lodged an appeal against the decision of the examining division refusing European patent application No. 04820962.1 (published as an international application with the publication No. WO 2005/066618).

In its decision the examining division held that claim 1 of the main request then on file did not satisfy the requirements of Article 123(2) EPC. The decision was issued after the appellants declined to approve the text proposed for grant in the communication under Rule 71(3) EPC dated 4 March 2014 issued by the examining division. This communication was based on the application documents of the auxiliary request then on file, the documents being labelled "Auxiliary request" and including amendments to the description proposed by the examining division and agreed upon by the appellants during the first-instance oral proceedings (EPO Form 2004C dated 4 March 2014).

II. With the notice of appeal and the statement of grounds of appeal, both dated 17 September 2014, the appellants filed claims according to a main request and a first auxiliary request and requested that the decision under appeal be set aside and that a patent be granted on the basis of one of these requests or that the grant proceeds "with the claims and text which were found allowable" by the examining division and "which were in the text proposed for grant in March 2014" (second auxiliary request).

III. In a communication of the board annexed to the summons to oral proceedings, the board introduced the following document into the proceedings:

A1: "Microelectrodes: Theory and Applications", edited by M. I. Montenegro *et al.*; Kluwer Academic Publishers (NL), NATO ASI Series, Series E: Applied Sciences, Vol. 197 (1991); title pages and pages 29 to 32, (a copy of which was attached to the communication)

and gave a preliminary assessment of the case.

IV. With a reply dated 16 February 2016 to the communication of the board, the appellants submitted complete application documents amended according to a main and a first auxiliary request. With the same letter the appellants filed copies of the following documents in support of the common general knowledge:

A1': same as document A1, showing pages 17 to 32;

A2 : "Compendium of Chemical Terminology - IUPAC Recommendations", A. D. McNaught *et al.*; International Union of Pure and Applied Chemistry, 2nd edition (1997); title page and page 179;

A3: "Fundamentals of Electrochemical Analysis", Z. Galus; Ellis Horwood, 2nd edition, 1994; title page and pages 1 to 20;

A4: "Electrochemical Methods - Fundamentals and Applications", A. J. Bard *et al.*; John Wiley & Sons, Inc., 2nd edition (2001); tithe page, pages v and vi, 176 to 190, 226 to 234, and 293 to 299.

V. During the oral proceedings held on 17 March 2016 before the board the appellants submitted an amended

set of claims 1 to 10 as a first auxiliary request replacing the previous first auxiliary request.

The appellants requested that the decision under appeal be set aside and that a patent be granted on the basis of the application documents of the main request filed with the letter dated 16 February 2016, or on the basis of the claims of the first auxiliary request filed during the oral proceedings before the board, or on the basis of the application documents according to the second auxiliary request and corresponding to the application documents of the "Auxiliary request" underlying the communication under Rule 71(3) EPC dated 4 March 2014 (cf. points I and II above).

At the end of the oral proceedings the board announced its decision.

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

"An electro-chemical pH sensor comprising at least two systems each comprising a molecule capable of redox reaction, and each mounted onto a conductive substrate configured to function as an electrode in contact with a fluid, wherein the redox reactions of the molecules display peak redox reaction potentials which are different and which are both sensitive to pH of the fluid."

Claim 1 of the first auxiliary request reads as follows:

"An electro-chemical pH sensor comprising at least two systems each comprising a molecule capable of redox reaction and each mounted on a conductive substrate configured to contact a fluid whose pH is to be sensed,

and for electrical connection to a voltage supply and electric current detector to perform voltammogramic measurements and an analyser to detect potentials at which peak redox reaction occurs and detect relative shifts in said voltammogramic measurements, wherein the redox reactions of the molecules display peak redox reaction potentials which are different and which are both sensitive to pH of the fluid."

Claim 1 of the second auxiliary request differs from claim 1 of the main request in that the expression "and each mounted onto a conductive substrate" is replaced by the expression "and mounted onto the same conductive substrate".

Reasons for the Decision

1. The appeal is admissible.

2. *Main request - Article 123(2) EPC*

2.1 Claim 1 of the main request underlying the decision under appeal was directed to an electro-chemical pH sensor comprising at least two systems each comprising a molecule capable of redox reaction. In its decision the examining division found that the claim did not satisfy the requirements of Article 123(2) EPC because the feature "two systems each comprising a molecule capable of redox reaction, and each coupled with a conductive substrate configured to function as an electrode in contact with a fluid" included the possibility that the two molecules were coupled with different conductive substrates, while the application

as originally filed only supported a sensor in which the two molecules were coupled with the same conductive substrate. More particularly, the examining division held that the possibility that the two molecules were coupled with different conductive substrates was not clearly and unambiguously disclosed in the application as originally filed, and in particular in the passage on page 14, lines 22 to 26, of the description referred to by the appellants.

Claim 1 of the present main request differs from claim 1 of the main request underlying the decision under appeal in that the expression "each coupled with a conductive substrate" has been replaced by "each mounted onto a conductive substrate". As indicated by the appellants in the statement of grounds of appeal (page 1, third paragraph), this amendment has no influence on the examining division's finding under Article 123(2) EPC.

2.2 In the statement of grounds of appeal the appellants essentially submitted that the redox molecules may be on one conductive substrate constituting the measuring electrode as defined in dependent claim 4 as originally filed, but that according to the passage on page 14, lines 22 to 30, of the description of the application as originally filed the molecules may alternatively be on different conductive substrates, i.e. on different measuring electrodes.

Dependent claim 4 as originally filed specifies that the two systems under consideration "are mounted onto the same conductive substrate", and the description as originally filed discloses embodiments illustrating this configuration (see for instance Fig. 4A and 4B and the corresponding description). The question is

therefore whether the complementary alternative, i.e. a sensor having the two redox systems or molecules mounted onto different conductive substrates, is clearly and unambiguously derivable from the content of the application as originally filed.

2.3 The board first notes that claim 1 as originally filed only defined the provision of two redox systems without specifying any of the structural features of the systems and, more particularly, without specifying any conductive substrate or electrode. As already noted by the board in the communication annexed to the summons to oral proceedings, the mere fact that dependent claim 4 of the application as originally filed specified that the two systems are mounted onto the same conductive substrate is not a sufficient basis for concluding that the complementary alternative, i.e. mounting the two systems onto different conductive substrates, is derivable from claims 1 and 4 as originally filed.

The appellants did not dispute this conclusion.

2.4 As regards the passage on page 14, lines 22 to 30, of the description of the application as originally filed, which was referred to by the appellants, the board notes that compliance with Article 123(2) EPC requires a clear and unambiguous disclosure for the skilled person of the amendment under consideration, and that the relevant skilled person in the present case is - as agreed by the appellants during the oral proceedings - the skilled person with an average knowledge in the technical field of electrochemistry. Contrary to the submissions of the appellants, however, the passage in question is not clear and, in addition, ambiguous as regards the provision of the molecules on a common electrode or on separate electrodes. Indeed, the

passage refers to "two measuring or indicator electrodes or molecules measuring two e.m.f. or potentials". It is true that in this wording the first and the third occurrences of the term "or" both appear to identify - as submitted by the appellants - synonymous or equivalent expressions ("measuring" and "indicator", and "e.m.f." and "potentials"). However, the second occurrence of the term "or" can be interpreted as submitted by the appellants as referring to two distinct alternatives, i.e. either the electrodes onto which the molecules would be mounted or the molecules themselves, but - as maintained by the examining division - it can also be interpreted as identifying two expressions that have to be construed as synonymous or equivalent, i.e. in the sense that the "electrodes" refer to the "molecules" themselves.

In addition, while some passages of the application as originally filed clearly differentiate between the molecules and the electrodes constituted by conductive substrates to which the molecules are attached (see for instance page 11, lines 17 to 19, page 12, lines 15 and 16, and Fig. 4A and 4B together with the corresponding description) and these passages refer - as submitted by the appellants - to "electrodes" within the normal meaning of the term in the field of electrochemistry, other passages of the application as originally filed refer to the "molecules" as constituting themselves "electrodes". In particular, in the passage on page 5, lines 21 to 23, of the description the "measuring electrode" represented in Fig. 4B is said to include an "internal reference electrode" and according to page 12, lines 15 and 16, this internal reference electrode is constituted by an "internal reference molecule" of PVF; and in the passage on page 8, lines 20 to 22 ("The R species forms an inert reference electrode, and

species M is an indicator electrode [...]"), the species or molecules are also designated as "electrodes".

The board concurs with the appellants' submissions that the fact that in the context of the application a measuring electrode is made by covalently attaching molecules to carbon particles which are then mechanically attached to a carbon electrode does not mean, in technical terms, that the molecule actually is an electrode within the proper meaning of the term. The board also concurs with the appellants that the term "electrode" is used many times in the application as originally filed with its normal meaning. However, as already noted above by reference to the passages on page 12, lines 15 and 16, and page 8, lines 20 to 22, in the application as originally filed the molecules themselves are also designated as "electrodes", possibly reflecting the fact that what is measured is the potential arising from the properties of the redox molecules immobilised onto a conductive substrate or electrode. Therefore, in the terminology used in the application as originally filed the molecules are said to be attached to a conductive substrate constituting an electrode but they are also designated as electrodes themselves, and the terminology used in the application does not allow it to be established clearly and unambiguously whether the expression "electrodes or molecules" in the passage on page 14, lines 22 to 30, of the original description refers to two distinct alternatives, i.e. to either the conductive substrate electrodes or the molecules attached thereto, or refers exclusively to the molecules alternatively designated as "electrodes" according to the terminology used in the application.

Furthermore, the reference in the same passage of the description on page 14, lines 22 to 30 to "the sum of the [Nernst] equations describing the individual measuring electrodes" (page 14, lines 27 to 30) is also ambiguous in that the "individual measuring electrodes" can refer - as submitted by the appellants - to two different redox molecules on two different conductive substrates or electrodes, but also to two different redox molecules on a common conductive substrate or electrode. Similar considerations apply to the further reference in the same passage to "measuring two e.m.f. or potentials" (page 14, lines 22 to 26). The two e.m.f. or potentials and the Nernst equations describing the individual measuring electrodes can be interpreted as referring to two actual measurements being respectively carried out with two different molecules each mounted on a different conductive substrate or electrode. However, they can also be interpreted in the context of the passage as referring to the theoretical evaluation of the performances - and in particular of the sensitivity - of the sensor (description, page 15, lines 10 to 12, and page 18, last paragraph) and therefore to the two e.m.f. or potential components constituting the respective contribution of two different molecules mounted on a common conductive substrate, the measuring signal from the conductive substrate resulting then from a combination of the two e.m.f. or potential components.

It follows from the above that the formulation of the passage of the description referred to by the appellants is unclear and ambiguous and fails to disclose clearly and unambiguously to the skilled person a sensor with two molecules each attached to a different conductive substrate.

2.4.1 In addition, it is a general rule of interpretation that an ambiguous passage of a disclosure is to be interpreted in the context of the whole disclosure. The board takes the view that in its overall context, and in particular in the technical context of the subsequent passages of the description on pages 14 to 18, the aforementioned passage on page 14, lines 22 to 30, is rather to be interpreted in the opposite direction from that submitted by the appellants. The reasons for this view of the board were already given in the communication annexed to the summons:

According to the same paragraph mentioned by the appellants, "the Nernst equation of the new sensor is the sum of the equations describing the individual measuring electrodes" (page 14, lines 27 to 30), and according to the subsequent passage (page 14, line 30 to page 15, line 8), this sum is represented by the sum of equations [3] and [4] as shown in equation [5]. Each of these equations, however, only defines the theoretical value of the so-called "half wave potential $E_{0.5}$" (page 14, line 30 to page 15, line 7, and equations [3] to [5]) to be subsequently compared with experimental results (page 15, lines 10 to 12), the half-wave potential of the "combined system" being given in equation [5] (page 15, lines 3 to 7) to explain the improvement in "the (theoretical) sensitivity of the sensor" of the invention (page 15, lines 10 to 12; see also page 15, lines 29 to 36). In addition, the so-called half-wave potential refers to a voltammetric measuring technique in which the potential is cyclically changed while the current response of the sensor is continuously measured (see for instance document A1, page 29, first paragraph together with Fig. 7 to 9); the half-wave potential is then

determined as the potential between the peaks of the resulting voltammogram (document A1, page 30, penultimate paragraph, and Fig. 8). In addition, this cyclic voltammetric measuring technique appears to correspond to the technique considered in the description of the application on pages 15 to 18, this technique involving monitoring peaks using cyclic voltammetry, reversing the scan direction, and sweeping or scanning in a reductive and in an oxidative fashion (see in particular description, page 16, lines 1 to 3 and lines 9 to 31, and page 18, lines 6 to 8). It follows that if equation [5] represents the half-wave potential of the combined system constituting the sensor of the invention (page 15, lines 3, 10 to 12, and 33 to 36), then what is measured in the sensor is the current through a single measuring electrode. This finding implies that the system referred to in the whole passage (page 14, line 22, to page 15, last line) consists of two "electrodes" constituted by two different molecules mounted on a common conductive substrate constituting the actual measuring electrode.

This conclusion is further supported by the paragraph on page 15, lines 14 to 19, referring to the difficulties in resolving "overlapping peaks" in a three-molecule system according to the invention. These "overlapping peaks" would only appear in a system in which the three molecules are mounted on a common conductive substrate, i.e. on a common measuring electrode, while in a system of three molecules mounted on different conductive substrates or electrodes three different voltages would be monitored or measured independently of each other without "overlapping peaks".

The further references on page 15, lines 21 to 27, to the square-wave voltammogram represented in Fig. 6 further confirm this conclusion because the voltammogram is obtained by measuring a single current (see the current values in Fig. 6) according to square-wave voltammetry, i.e. a voltammetric technique analogous to cyclic voltammetry but in which the potential is not cyclically varied, but swept in one direction (in the case of Fig. 6, from -1.0 to 0.6 V; see also page 16, lines 28 to 33).

Therefore, the disclosure on page 14, line 30 *et seq.*, does not allow the mentioned ambiguity in the passage on page 14, lines 22 to 30, to be resolved in line with the appellants' interpretation of the aforementioned passage; on the contrary, this disclosure tends rather to indicate that the passage on page 14, lines 22 to 30, is to be interpreted as referring to the provision of the redox systems or molecules mounted onto a common conductive substrate or electrode of the sensor.

2.4.2 In reply to this view of the board, the appellants filed further pages of document A1 (cf. document A1') and also documents A2, A3 and A4 in support of the common general knowledge in the field of electrochemical analysis. As submitted by the appellants, these documents showed the definition of the half-wave potential (document A2) and its use (documents A3 and A4), in particular in both polarography and voltammetry (document A2). The appellants referred to different passages of these documents (document A1', document A3, pages 16 and 17, and document A4, pages 178, 179, 183 and 293 to 299) and submitted that the half-wave potential was not only used in cyclic voltammetry, that this form of voltammetry only provided a convenient way to measure

the half-wave potential, and that the differences between cyclic and square-wave voltammetry were not material for the present purposes. In the same letter and during the oral proceedings the appellants, in view of this evidence, contested that the passages on page 14, line 30 *et seq.*, of the description would prompt the reader to interpret the passage on page 14, lines 22 to 30, as relating to a sensor having the two molecules on a common conductive substrate or electrode.

In the opinion of the board, however, none of these submissions disprove the considerations in point 2.4.1 above, and in any case the appellants' submissions would imply, at the most, that the passages on page 14, line 30 *et seq.*, which relate to the performances of the individual redox systems and of their combination, would cover indistinctly both situations, i.e. a sensor with the molecules being attached to the same conductive substrate or to different conductive substrates, without the latter situation being clearly and unambiguously identified or disclosed. Therefore, the appellants' submissions in this respect do not help in resolving the ambiguity of the passage on page 14, lines 22 to 30, of the description as referring to a sensor including two molecules or species attached to two different conductive substrates or electrodes.

2.4.3 The appellants have also referred to Figs. 6 and 7A of the application as originally filed. Fig. 6 shows three different curves of current versus potential, each of the curves representing a square-wave voltammogram recorded with the sensor of the invention at a different pH value (page 6, lines 5 to 7), and neither the figure itself nor the corresponding description on page 15, lines 21 to 27, allows the conclusion that

each of the measurements represented in Fig. 6 results from two distinct measurements made with two molecules each attached to a respective conductive substrate. On the contrary, the appellants have acknowledged that Fig. 6 was obtained using one electrode carrying two molecules (letter dated 16 February 2016, page 5, second paragraph). The appellants have submitted in this respect that the fact that both molecules were on the same electrode does not affect the results, that the measurements can be made with either two molecules on one electrode or two molecules on different electrodes, and that the subsequent disclosure in the description applies equally to two molecules on respective electrodes and to two molecules on one electrode. However, since the measurements are carried out with the molecules attached to the same substrate (as for instance represented in Figs. 4A and 4B), the arguments of the appellants are insufficient to identify any clear and unambiguous disclosure in the original application of a sensor in which the measurements are carried out with two molecules attached to different electrodes.

The appellants' further submission that in Fig. 6 two measurements were made, one for one molecule and one for another molecule, can only be taken to mean that in each of the curves represented in Fig. 6 the different peaks can be attributed to one or the other of the molecules, but not to mean that measurements are carried out with the molecules attached to different electrodes as this would contradict the appellants' submissions that the curves were obtained using one electrode carrying the two molecules.

Similar considerations apply to Fig. 7A. This figure shows the dependence of the peak potential on the pH

value for a first redox system (anthraquinone or AQ), for a second redox system (diphenyl-p-phenylenediamide), and for a combination of the two redox systems (page 6, lines 9 to 11), the values for the combined redox system being obtained by combining the values for the first and the second redox systems as described in equation [5] (page 15, lines 29 to 36). This disclosure appears to pertain to the evaluation of the performances of the sensor of the invention by means of the Nernst equation representing the combination of the two redox systems, and the figure represents at the most measurements carried out with the first redox system on an electrode, with the second redox system on an electrode, and with both redox systems on a common electrode for the purposes of analysing the performances of the respective redox reactions. However, it does not constitute a clear and unambiguous disclosure of a sensor constituted by two redox systems each attached to a different electrode.

2.5 Finally, the appellants have also referred to Figs. 4C and 4D and to Figs. 7B to 7E of the application in support of their case. According to the appellants, Figs. 4C and 4D show that each molecule or redox system is attached to a respective conductive substrate or electrode 46 and 47. However, Fig. 4C represents schematically the redox reaction of the redox system AQ-MWCNT resulting from the covalent derivatisation of MWCNT (multi-walled carbon nanotubes) by anthraquinone-1-diazonium chloride, and Fig. 4D represents schematically the redox reaction of the redox system NB-MWCNT resulting from the covalent derivatisation of MWCNT by 4-nitrobenzendediazonium tetrafluoroborate (page 12, line 18 to page 13, line 10), and there is no indication in the application as originally filed that these two schematic

representations of two different redox reactions shown in two different figures would also constitute the schematic representation of the structure of a single sensor comprising both redox systems AQ-MWCNT and NB-MWCNT with distinct, separate MWCNT substrates 46 and 47. The board also notes that these two substrates 46 and 47 are referred to on page 13, lines 8 to 10, as "respective substrates 46 and 47", and that the subsequent paragraph discloses stirring MWCNTs into a solution "of either Fast Red AL (anthraquinone-1-diazonium chloride) or Fast Red GG (4-nitrobenzenediazonium tetrafluoroborate)" (page 13, lines 12 *et seq*.). However, these passages relate to a particular aspect, namely to the specification of the method of binding the redox active species or molecules to a "respective" substrate of MWCNT by derivatisation (page 12, line 18 to page 13, line 29), i.e. they relate to a technique that can be used in binding the species or molecules to a substrate in the sensor of the invention. They do not relate to the manufacture of the claimed sensor itself, let alone disclose in a clear and unambiguous way the manufacture of a sensor having the two different species or molecules attached to different substrates each configured to operate as an electrode, as required by the claimed subject-matter.

As regards Figs. 7B to 7E, these figures show different plots and curves representing the peak potential against pH for each of the redox systems AQ-MWCNT and NB-MWCNT of the examples disclosed with reference to Fig. 4C and 4D mentioned above (page 6, lines 13 to 16, and page 17, line 8 to page 18, line 29), and the corresponding disclosure of these figures is also silent as to any measurement carried out with a sensor comprising both redox systems AQ-MWCNT and NB-MWCNT

each attached to a respective conductive substrate or electrode.

2.6 In view of the above, the board concludes that the subject-matter of claim 1 of the present main request constitutes an unallowable generalisation, as the claim results from a combination of claim 1 and dependent claim 4 as originally filed, amended so as to cover a complementary alternative for which no clear and unambiguous disclosure can be found in the application as originally filed, contrary to Article 123(2) EPC.

3. *First auxiliary request - Admissibility*

3.1 The set of amended claims of the present first auxiliary request was filed during the oral proceedings before the board. According to Article 12(2) RPBA (Rules of Procedure of the Boards of Appeal, OJ EPO 2007, 536), the statement of grounds of appeal must contain a party's complete case. Any amendment to a party's case after it has filed its grounds of appeal may, according to Article 13(1) RPBA, be admitted and considered at the board's discretion. The discretion must be exercised in view of *inter alia* the complexity of the new subject-matter submitted, the current state of the proceedings and the need for procedural economy.

3.2 The present first auxiliary request filed during the oral proceedings replaced a previous first auxiliary request filed with the reply dated 16 February 2016 and admitted during the oral proceedings but subsequently objected to by the board under Article 84 EPC 1973 and Article 123(2) EPC. In particular, claim 1 of this previous first auxiliary request was directed to "An electro-chemical pH sensor comprising at least two systems each comprising a molecule capable of redox

reaction and each mounted on a conductive substrate configured to contact the fluid". The board noted during the oral proceedings that it was not clear in the context of the claim whether the "conductive substrate" configured to contact a fluid was to be construed or not as operating as an electrode (Article 84 EPC 1973). In addition, if the conductive substrate were to be construed as constituting, or operating as, an electrode, the same objection as raised under Article 123(2) EPC with regard to claim 1 of the main request would also apply to this claim, and if the conductive substrate were to be construed as not operating as an electrode the claimed subject-matter would not appear to be supported by the description (Article 84 EPC 1973) because there was no disclosure in the description of a sensor having molecules mounted on a conductive substrate not operating as an electrode.

3.2.1 In view of these objections, the appellants replaced the previous first auxiliary request by the present first auxiliary request. According to the appellants, claim 1 of the present first auxiliary request essentially results from a combination of claim 1 and dependent claim 9 of the previous first auxiliary request, the combination being further amended so as to clarify the nature of the fluid referred to in claim 1 of the previous first auxiliary request. However, as noted by the board during the oral proceedings, not only did the amendments to claim 1 according to the present first auxiliary request not appear to overcome the objections raised with regard to the previous first auxiliary request, but, in addition, gave rise to new issues. In particular, the amended claim 1 incorporated some of the features of dependent claim 9 of the previous first auxiliary request, but not the feature

specified in this claim according to which the sensor was for determining the concentration of a molecular species in a fluid. Accordingly, the question of whether this omission complied with the EPC, and in particular with the requirements of Article 84 EPC 1973 and Article 123(2) EPC, would have required additional discussion. Furthermore, while the previous dependent claim 9 was directed to a sensor "comprising a voltage supply and electric current detector [...] and an analyser", the amended claim 1 did not require the sensor to comprise these means since the claim only defined the suitability "for electrical connection to a voltage supply and electric current detector [...] and an analyser", and the limiting character of this functional feature would also have required further discussion with regard to Article 84 EPC 1973.

As a further point, the question of whether the amendments were sufficient to overcome the objection already raised with regard to claim 1 of the previous first auxiliary request (cf. point 3.1 above) and relating to the technical function of the conductive substrate in the claimed sensor, i.e. relating to whether or not the conductive substrate was to be interpreted as operating as an electrode in the sensor, would also have required further discussion with regard to Article 84 EPC 1973 and Article 123(2) EPC. This was especially in view of the appellants' submissions that it was intended that the claim remained silent as to the presence of electrodes, as was the case in claim 1 as originally filed.

3.2.2 During the oral proceedings the appellants submitted that the amendments to claim 1 according to the present first auxiliary request were occasioned, and therefore justified, by the objections raised by the board during

the oral proceedings with regard to claim 1 of the previous first auxiliary request (cf. point 3.2 above, first paragraph). However, these objections under Article 84 EPC 1973 and Article 123(2) EPC were not presented by the board for the first time during the oral proceedings. The essential aspects of these objections were already raised in the communication annexed to the summons to oral proceedings (cf. point 4.2, second paragraph) in respect of the first auxiliary request submitted with the statement of grounds of appeal and subsequently replaced by the previous first auxiliary request filed with the letter dated 16 February 2016 and referred to in point 3.2 above. Accordingly, there was no new - let alone unexpected - situation during the oral proceedings that could have justified the amendments made to claim 1 according to the present auxiliary request at such a late stage of the proceedings.

3.3 In the absence of any circumstance justifying the filing of the set of claims amended according to the present first auxiliary request during the oral proceedings (cf. point 3.2.2 above), and since the amendments were not *prima facie* capable of overcoming the objections raised and, in addition, opened up new issues requiring additional discussion that would have risked unduly delaying the proceedings (cf. point 3.2.1 above), the board, exercising its discretion under Article 13(1) RPBA, did not admit the present first auxiliary request into the proceedings.

4. *Second auxiliary request*

The application documents of the second auxiliary request correspond to the application documents labelled "Auxiliary request" underlying the

communication issued by the examining division under Rule 71(3) EPC dated 4 March 2014 (cf. point I above, second paragraph). Claim 1 of this request is directed to a sensor of the type defined in claim 1 of the main request. However, the objection under Article 123(2) EPC addressed in point 2 above with respect to the main request does not apply to claim 1 of the second auxiliary request because this claim requires the at least two redox systems to be "mounted onto the same conductive substrate" (cf. point VI above, last paragraph).

In view of the foregoing, the board considered it appropriate to exercise its discretion under Article 111(1) EPC 1973 and remit the case to the department of first instance for further prosecution on the basis of the second auxiliary request.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance for further prosecution.

The Registrar: The Chairwoman:

M. Kiehl T. Karamanli

Decision electronically authenticated