Claims

1. A method for determining at least one membrane property of an analyte sensor ~~(112)~~, wherein the analyte sensor ~~(112)~~ comprises at least two measurement electrodes ~~(114)~~, wherein at least one of the measurement electrodes ~~(114)~~ comprises at least one membrane element ~~(122)~~ having at least one membrane property, the method comprising the following steps:
   a) ~~(134)~~ generating at least one fast-transient voltage signal and applying the fast-transient voltage signal to the measurement electrodes ~~(114)~~ at an application time t_0;
   b) ~~(136)~~ measuring a first response signal U_1 at a first time t_1 and a second response signal U_2 at a second time t_2 with $t_0 \neq t_1 \neq t_2$, wherein the application time t_0 precedes the first time t_1 and the second time t_2;
   c) ~~(138)~~ determining a response signal U_0 at the application time t_0 by evaluating the first response signal U_1 and the second response signal U_2;
   d) ~~(140)~~ determining the at least one membrane property by evaluating of the response signal U_0 at the application time t_0.

2. The method according to claim 1, wherein the evaluating of the response signal U_0 in step d) comprises determining equivalent series resistance of the analyte sensor ~~(112)~~ and determining the at least one membrane property from the equivalent series resistance of the analyte sensor ~~(112)~~.

3. The method according to any one of claims 1 or 2, wherein the first time t_1 is in the range from 1 µs to 5 µs after the application time t_0.

4. The method according to any one of claims 1 to 3, wherein the second time t_2 is in the range from 1 µs to 5 µs after the first time t_1.

5. The method according to any one of claims 1 to 4, wherein the analyte sensor ~~(112)~~ is an in vivo sensor.

6. The method according to any one of claims 1 to 5, wherein the method is performed during in vivo measurement.

7. The method according to any one of claims 1 to 6, wherein the method is performed during manufacturing of the analyte sensor ~~(112)~~.

8. The method according to any one of claims 1 to 7, wherein the method comprises at least one failsafe step, wherein the failsafe step is triggered depending on the determined membrane property.

9. The method according to any one of claims 1 to 8, wherein the membrane property is permeability of the membrane element ~~(122)~~.

10. The method according to any one of claims 1 to 9, wherein the fast-transient voltage signal has a square wave form or a sine wave signal form.

11. The method according to any one of claims 1 to 10, wherein the fast-transient voltage signal comprises a non-continuous signal such as a pulse, wherein a pulse duration is ≤ 20 µs, preferably ≤ 10 µs.

12. A ~~M~~method for determining a concentration of at least one analyte in bodily fluid using at least one analyte sensor ~~(112)~~, wherein the analyte sensor ~~(112)~~ comprises at least two measurement electrodes ~~(114)~~, wherein at least one of the measurement electrodes ~~(114)~~ comprises at least one membrane element ~~(122)~~ having at least one membrane property, wherein the method comprises determining at least one membrane property of the analyte sensor ~~(112)~~ according to any one of claims 1 to 11, wherein the method comprises at least one analyte measurement step, wherein in the measurement step the concentration of the analyte is determined.

13. A computer program comprising program means for performing the method according to any one of claims 1 to 11 and/or the method according to claim 12 while the computer program is being executed on a computer or on a computer network.

14. An analytical system ~~(110)~~ for determining a concentration of at least one analyte in bodily fluid, wherein the analytical system ~~(110)~~ comprises at least one analyte sensor ~~(112)~~, wherein the analyte sensor ~~(112)~~ comprises at least two measurement electrodes ~~(114)~~, wherein at least one of the measurement electrodes ~~(114)~~ comprises at least one membrane element ~~(122)~~ having at least one membrane property, wherein the analytical

system ~~(110)~~ comprises at least one signal generator device ~~(124)~~ configured for generating at least one fast-transient voltage signal, wherein the signal generator device ~~(124)~~ is configured for applying the fast-transient voltage signal to the two measurement electrodes ~~(114)~~, wherein the analytical system ~~(110)~~ comprises at least one measurement unit ~~(126)~~ configured for measuring a first response signal U_1 at a first time t_1 and a second response signal U_2 at a second time t_2 with $t_0 \neq t_1 \neq t_2$, wherein the application time t_0 precedes the first time t_1 and the second time t_2, wherein the analytical system ~~(110)~~ comprises at least one evaluation device ~~(132)~~, wherein the evaluation device ~~(132)~~ is configured for determining a response signal U_0 at the application time t_0 by evaluating the first response signal U_1 and the second response signal U_2, wherein the evaluation device ~~(132)~~ is configured for determining the at least one membrane property by evaluating of the response signal U_0 at the application time t_0.

15. The analytical system according to claim 14, wherein the analytical system ~~(110)~~ is configured for performing the method according to any one of claims 1 to 11 and/or the method according to claim 12.