Claims

1. A method for detecting a failure of at least one component ~~(122)~~ of a continuous analyte monitoring system ~~(110)~~, wherein the continuous analyte monitoring system ~~(110)~~ comprises the component ~~(122)~~ and at least one failure detection resistor ~~(124)~~, wherein the continuous analyte monitoring system ~~(110)~~ comprises at least one analyte sensor ~~(112)~~ comprising at least two measurement electrodes ~~(114)~~, the method comprising the following steps:
   i) applying a constant voltage between the at least two measurement electrodes ~~(112)~~ of the analyte sensor ~~(114)~~ and measuring a first response signal,
   ii) applying a failure detection signal distinguishable from the constant voltage and/or from the first response signal in frequency and/or in height to the continuous analyte monitoring system ~~(110)~~ and measuring a second response signal to the failure detection signal using the failure detection resistor ~~(124)~~;
   iii) determining an information depending on at least one actual property of the component ~~(122)~~ by evaluating the first response signal and the second response signal, wherein a failure is detected if the information deviates from at least one expected value more than at least one predetermined tolerance.

2. The method according to claim 1, wherein the component ~~(122)~~ is one or more of at least one measurement resistance ~~(126)~~ of the continuous analyte monitoring system ~~(110)~~ and/or at least one membrane element ~~(128)~~ comprised by at least one of the measurement electrodes ~~(114)~~.

3. The method according to any one of claims 1 or 2, wherein the constant voltage is about 50 mV.

4. The method according to any one of claims 1 to 3, wherein the analyte sensor ~~(112)~~ is a two-electrode sensor comprising two measurement electrodes ~~(114)~~ or a three-electrode sensor comprising three measurement electrodes ~~(114)~~.

5. The method according to any one of claims 1 or 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 in vivo.

7. The method according to claim 2, wherein the component ~~(122)~~ is the at least one measurement resistance R_1 ~~(126)~~, wherein step i) comprises applying the constant voltage between the measurement electrodes ~~(114)~~ and determining a first current I_1 as first response signal using the measurement resistance R_1 ~~(126)~~, wherein step ii) comprises applying a second current I_2 as failure detection signal to the continuous analyte monitoring system ~~(110)~~ and measuring a resulting total current I_{tot} as second response signal using the failure detection resistor R_2 ~~(124)~~, wherein the second current I_2 is significantly smaller than the first current I_1, wherein in step iii) a failure is detected if the resulting total current I_{tot} deviates more than the predetermined tolerance from a sum of the first current I_1 and the second current I_2.

8. The method according to claim 7, wherein the second current I_2 is around 5 nA or less.

9. The method according to claim 2, wherein the component ~~(122)~~ is the membrane element ~~(128)~~, wherein the membrane element ~~(128)~~ has a membrane resistance, wherein the continuous analyte monitoring system ~~(110)~~ comprises at least two serial failure detection resistors R_3, R_4 in series with the membrane resistance ~~(110)~~, wherein step i) comprises measuring a base voltage as a first response signal of the continuous analyte monitoring system ~~(110)~~, wherein step ii) comprises generating at least one fast-transient voltage signal and applying the fast-transient voltage signal as failure detection signal to the measurement electrodes ~~(114)~~, wherein step ii) further comprises measuring a first membrane response signal with both the serial resistors R_3, R_4 as reference and measuring at least one second membrane response signal between the serial resistors R_3, R_4 with one of the serial resistors R_3, R_4 as reference, wherein step iii) comprises determining a first membrane resistance $R_{mem,1}$ by evaluating of the base voltage and the first membrane response signal and determining a second membrane resistance $R_{mem,2}$ by evaluating of the base voltage and the second membrane response signal, wherein step iii) further comprises comparing the first membrane resistance $R_{mem,1}$ and the second membrane resistance $R_{mem,2}$, wherein a failure is detected if the first membrane resistance $R_{mem,1}$ and the second membrane resistance $R_{mem,2}$ deviate from one another more than the predetermined tolerance.

10. The method according to claim 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 9 or 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 method for determining a concentration of at least one analyte in bodily fluid using at least one continuous analyte monitoring system ~~(110)~~, wherein the method comprises detecting a failure of at least one component ~~(122)~~ of the continuous analyte monitoring system ~~(110)~~ 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 at least one analyte is determined.

13. A continuous analyte monitoring system ~~(110)~~ for determining a concentration of at least one analyte in bodily fluid, wherein the continuous analyte monitoring system ~~(110)~~ comprises at least one analyte sensor ~~(112)~~ having at least two measurement electrodes ~~(114)~~, wherein the continuous analyte monitoring system ~~(110)~~ comprises at least one component ~~(122)~~ and at least one failure detection resistor ~~(124)~~, wherein the continuous analyte monitoring system ~~(110)~~ comprises at least one controlling unit ~~(130)~~, wherein the controlling unit ~~(130)~~ is configured for applying a constant voltage between the measurement electrodes ~~(114)~~ and for measuring at least one first response signal, wherein the controlling unit ~~(130)~~ is configured for applying a failure detection signal distinguishable from the constant voltage and/or from the first response signal in frequency and/or in height to the continuous analyte monitoring system ~~(110)~~ and for measuring a response signal to the failure detection signal using the failure detection resistor ~~(124)~~, wherein the controlling unit ~~(130)~~ is configured for determining an information depending on at least one actual property of the component by evaluating the response signal, wherein the controlling unit ~~(130)~~ is configured for detecting a failure if the information deviates from at least one expected value more than at least one predetermined tolerance.

14. The continuous analyte monitoring system ~~(110)~~ according to claim 13, wherein the continuous analyte monitoring 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.