Claims

1. A method for detecting a failure of at least one component of a continuous analyte monitoring system, wherein the continuous analyte monitoring system comprises the component and at least one failure detection resistor, wherein the continuous analyte monitoring system comprises at least one analyte sensor comprising at least two measurement electrodes, the method comprising the following steps:
   i) applying a constant voltage between the at least two measurement electrodes of the analyte sensor 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 and measuring a second response signal to the failure detection signal using the failure detection resistor;
   iii) determining an information depending on at least one actual property of the component 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 is one or more of at least one measurement resistance of the continuous analyte monitoring system and/or at least one membrane element comprised by at least one of the measurement electrodes.

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 is a two-electrode sensor comprising two measurement electrodes or a three-electrode sensor comprising three measurement electrodes.

5. The method according to any one of claims 1 or 4, wherein the analyte sensor 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 is the at least one measurement resistance R_1, wherein step i) comprises applying the constant voltage between the measurement electrodes and determining a first current I_1 as first response signal using the measurement resistance R_1, wherein step ii) comprises applying a second current I_2 as failure detection signal to the continuous analyte monitoring system and measuring a resulting total current I_{tot} as second response signal using the failure detection resistor R_2, 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 is the membrane element, wherein the membrane element has a membrane resistance, wherein the continuous analyte monitoring system comprises at least two serial failure detection resistors R_3, R_4 in series with the membrane resistance, wherein step i) comprises measuring a base voltage as a first response signal of the continuous analyte monitoring system, 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, 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, wherein the method comprises detecting a failure of at least one component of the continuous analyte monitoring system 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 for determining a concentration of at least one analyte in bodily fluid, wherein the continuous analyte monitoring system comprises at least one analyte sensor having at least two measurement electrodes, wherein the continuous analyte monitoring system comprises at least one component and at least one failure detection resistor, wherein the continuous analyte monitoring system comprises at least one controlling unit, wherein the controlling unit is configured for applying a constant voltage between the measurement electrodes and for measuring at least one first response signal, wherein the controlling unit 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 and for measuring a response signal to the failure detection signal using the failure detection resistor, wherein the controlling unit 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 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 according to claim 13, wherein the continuous analyte monitoring system is configured for performing the method according to any one of claims 1 to 11 and/or the method according to claim 12.