Metrohm

Application Bulletin 800105032EN

Check of Optrode with *tiamo*™ and OMNIS

Branch

Chemical; electronics & electronic components

Keywords

Optrode; check; wavelength; no potential change; potential; potential measurement; *tiamo*™; OMNIS; 6.1115.000; S01; S015; S09; S090

Summary

Before starting a sample analysis, it is essential to know if the electrode is in a good state or not. A properly working electrode guarantees high quality measurements and ensures accurate and precise results. Furthermore, tedious error tracking can be omitted, and no sample is wasted due to a defect or an old electrode.

Several procedures exist to check the health of an electrode. This application bulletin outlines the most convenient process by measuring the potential at different wavelengths in degassed deionized water.

Check of Optrode with *tiamo*™

Instruments

- Titrando or 867 pH Module

Electrodes

Optrode	6.1115.000

Reagents

- Deionized water (degassed)

Check of Optrode

The deionized water is degassed either by allowing nitrogen to flow through for 5–10 minutes or by applying a vacuum for 5–10 minutes. For the measurement, *tiamo*™ is opened and the method as well as the report template are imported. Adjust the method accordingly by choosing the correct measuring device and electrode. In addition, the database command must be adapted so that the data are saved in the corresponding database. Afterwards, the measurement is started and all wavelengths are checked automatically. Two requests will appear on screen: one for entering the serial number, and one for entering the article number. This is required to ensure that the serial and article number appear on the report. At the end, a report is generated which states if the check of the Optrode passes or fails.

Parameters

Mode	MEAS U
Signal drift	2 mV/min
Min. waiting time	300 s
Max. waiting time	600 s

Check of Optrode with **OMNIS**

Instruments

- OMNIS Titrator with analog measuring module

Electrodes

Optrode	6.1115.000
OMNIS adapter cable	6.02109.000

Reagents

- Deionized water (degassed)

Sample preparation

No sample preparation is required.

Check of Optrode

The deionized water is degassed either by allowing nitrogen to flow through for 5–10 minutes or by applying a vacuum for 5–10 minutes. For the measurement, **OMNIS** software is opened and the operation procedure with a work system is imported. Adjust the work system accordingly by choosing the correct measuring interface and electrode. Afterwards, the measurement is started and all wavelengths are checked. In between measurements, the wavelength must be adjusted manually by placing a magnet against the head of the Optrode (sign with magnet). Ultimately, a report is generated that states if the check of the Optrode passes or fails.

Parameters

Mode	MEAS U
Signal drift	2 mV/min
Min. waiting time	300 s
Max. waiting time	600 s

Comments

- A minimum waiting time of 300 s was programmed to ensure that the full light intensity of the Optrode is reached.
- Make sure that the deionized water is properly degassed. Otherwise, air bubbles might disturb the check of the Optrode.
- To pass the check of the Optrode, the following criteria must be met:

Wavelength in nm	Lower limit mV	Upper limit mV
470	150	800
502	200	800
520	200	800
574	200	800
590	200	800
610	200	800
640	200	800
660	200	800

- Please contact your local Metrohm Service dealer for the appropriate methods and the report template.
- If a check of the Optrode fails, contact your Metrohm Service dealer. They can help adjust the light intensity of the Optrode.

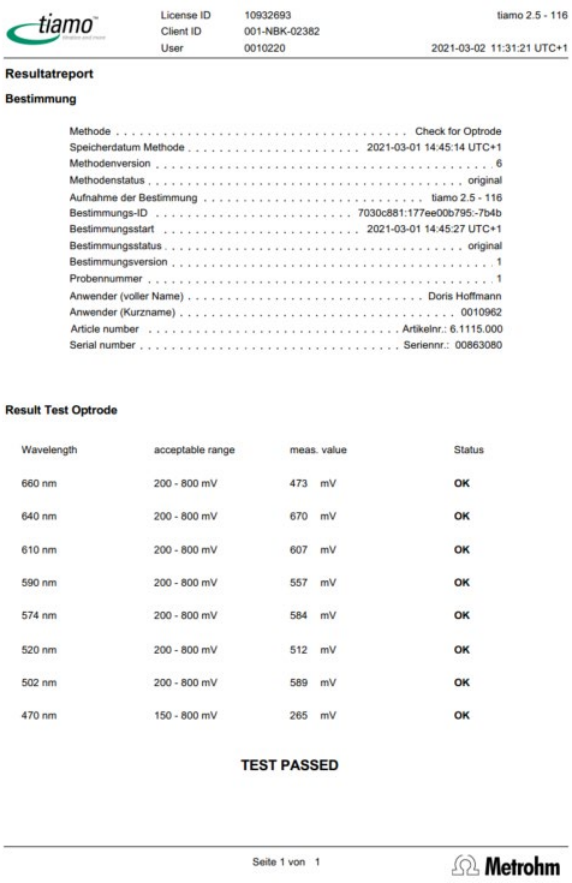
Author

Competence Center Titration

Metrohm International Headquarters

Appendix

Example reports *tiamo*™ and OMNIS



tiamo

License ID 10932693 tiamo 2.5 - 116
Client ID 001-NBK-02382
User 0010220 2021-03-02 11:31:21 UTC+1

Resultatreport

Bestimmung

Methode	Check for Optrode
Speicherdatum Methode	2021-03-01 14:45:14 UTC+1
Methodenversion	6
Methodenstatus	original
Aufnahme der Bestimmung	tiamo 2.5 - 116
Bestimmungs-ID	7030c881:177ee00b795:-7b4b
Bestimmungsstart	2021-03-01 14:45:27 UTC+1
Bestimmungsstatus	original
Bestimmungsversion	1
Probennummer	1
Anwender (voller Name)	Doris Hoffmann
Anwender (Kurzname)	0010962
Article number	ArtikelNr.: 6.1115.000
Serial number	Seriennr.: 00863080

Result Test Optrode

Wavelength	acceptable range	meas. value	Status
660 nm	200 - 800 mV	473 mV	**OK**
640 nm	200 - 800 mV	670 mV	**OK**
610 nm	200 - 800 mV	607 mV	**OK**
590 nm	200 - 800 mV	557 mV	**OK**
574 nm	200 - 800 mV	584 mV	**OK**
520 nm	200 - 800 mV	512 mV	**OK**
502 nm	200 - 800 mV	589 mV	**OK**
470 nm	150 - 800 mV	265 mV	**OK**

TEST PASSED

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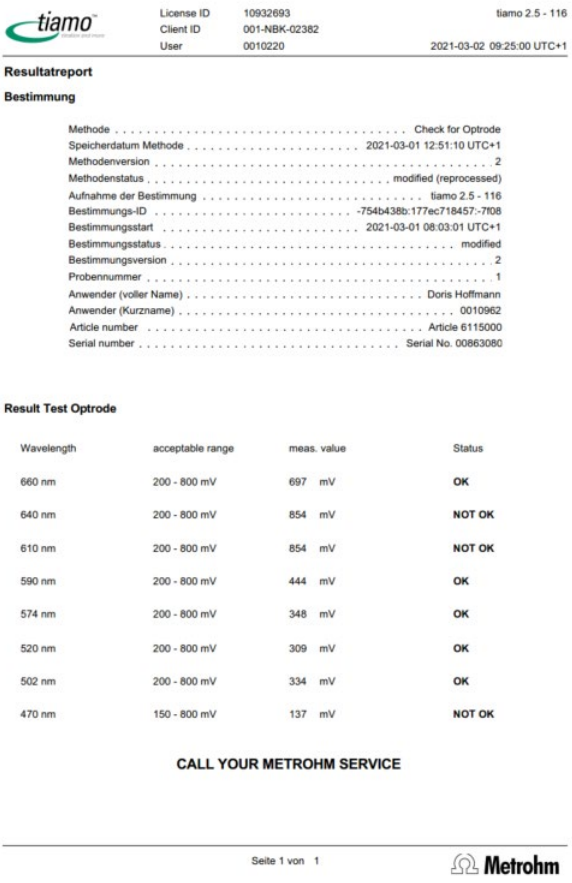
Figure 1: Example of a passing Optrode check report generated with ***tiamo***™.



tiamo

License ID 10932693 tiamo 2.5 - 116
Client ID 001-NBK-02382
User 0010220 2021-03-02 09:25:00 UTC+1

Resultatreport

Bestimmung

Methode	Check for Optrode
Speicherdatum Methode	2021-03-01 12:51:10 UTC+1
Methodenversion	2
Methodenstatus	modified (reprocessed)
Aufnahme der Bestimmung	tiamo 2.5 - 116
Bestimmungs-ID	-754b438b:177ec718457:-7f08
Bestimmungsstart	2021-03-01 08:03:01 UTC+1
Bestimmungsstatus	modified
Bestimmungsversion	2
Probennummer	1
Anwender (voller Name)	Doris Hoffmann
Anwender (Kurzname)	0010962
Article number	Article 6115000
Serial number	Serial No. 00863080

Result Test Optrode

Wavelength	acceptable range	meas. value	Status
660 nm	200 - 800 mV	697 mV	**OK**
640 nm	200 - 800 mV	854 mV	**NOT OK**
610 nm	200 - 800 mV	854 mV	**NOT OK**
590 nm	200 - 800 mV	444 mV	**OK**
574 nm	200 - 800 mV	348 mV	**OK**
520 nm	200 - 800 mV	309 mV	**OK**
502 nm	200 - 800 mV	334 mV	**OK**
470 nm	150 - 800 mV	137 mV	**NOT OK**

CALL YOUR METROHM SERVICE

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Figure 2: Example of a failing Optrode check report generated with ***tiamo***™.

Results

Result name	Value	Unit	Mean value	s(abs)	s(rel)	n
Potential 470 nm	294	mV				
Potential 502 nm	562	mV				
Potential 520 nm	511	mV				
Potential 574 nm	452	mV				

Result name	Value	Unit	Mean value	s(abs)	s(rel)	n
Potential 590 nm	471	mV				
Potential 610 nm	551	mV				
Potential 640 nm	655	mV				
Potential 660 nm	444	mV				
Passed?	Test for Optrode passed					

Result monitoring

Variable	Value	Unit	Status	Min. (warn.)	Max. (warn.)	Min. (control)	Max. (control)
Measvalue.Final.Potential measurement 470 nm	294	mV	●	150	800		
Measvalue.Final.Potential measurement 502 nm	562	mV	●	200	800		
Measvalue.Final.Potential measurement 520 nm	511	mV	●	200	800		
Measvalue.Final.Potential measurement 574 nm	452	mV	●	200	800		
Measvalue.Final.Potential measurement 590 nm	471	mV	●	200	800		
Measvalue.Final.Potential measurement 610 nm	551	mV	●	200	800		

Variable	Value	Unit	Status	Min. (warn.)	Max. (warn.)	Min. (control)	Max. (control)
Measvalue.Final.Potential measurement 640 nm	655	mV	●	200	800		
Measvalue.Final.Potential measurement 660 nm	444	mV	●	200	800		

Figure 3: Example of a passing Optrode check report generated with **OMNIS.**

Results

Result name	Value	Unit	Mean value	s(abs)	s(rel)	n
Potential 470 nm	293	mV				
Potential 502 nm	564	mV				
Potential 520 nm	511	mV				
Potential 574 nm	2	mV				

Result name	Value	Unit	Mean value	s(abs)	s(rel)	n
Potential 590 nm	481	mV				
Potential 610 nm	556	mV				
Potential 640 nm	647	mV				
Potential 660 nm	438	mV				
Passed?	Test for Optrode not passed. Call your Salesrep for Support					

Result monitoring

Variable	Value	Unit	Status	Min. (warn.)	Max. (warn.)	Min. (control)	Max. (control)
Measvalue.Final.Potential measurement 470 nm	293	mV	●	150	800		
Measvalue.Final.Potential measurement 502 nm	564	mV	●	200	800		
Measvalue.Final.Potential measurement 520 nm	511	mV	●	200	800		
Measvalue.Final.Potential measurement 574 nm	2	mV	▲	200	800		
Measvalue.Final.Potential measurement 590 nm	481	mV	●	200	800		
Measvalue.Final.Potential measurement 610 nm	556	mV	●	200	800		

Variable	Value	Unit	Status	Min. (warn.)	Max. (warn.)	Min. (control)	Max. (control)
Measvalue.Final.Potential measurement 640 nm	647	mV	●	200	800		
Measvalue.Final.Potential measurement 660 nm	438	mV	●	200	800		

Figure 4: Example of a failing Optrode check report generated with **OMNIS.**