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Bromide Sealed Electrode Sensor Bundle

Product Number: ENBRO048

Overview

Bromide ions are naturally found in sea water and may be added to swimming pools or hot tubs as a disinfectant.
The Bromide sensor measures the concentration of bromide ions (Br-) in an aqueous solution.
The Bromide Sealed Electrode Sensor can be connected to all einstein™ data loggers.

Typical experiments

Water Quality

- Water Quality Studies

How it works

The Bromide sensor contains a Permafil (non-refillable) electrode containing an oxidized form of bromide inside a membrane. When inserted into a solution containing bromide molecules the bromide in the solution

is attracted to the oxidized bromide in the membrane. By measuring the electrical potential of this attraction the sensor can determine the level of bromide in the solution. Because they only attract other bromide molecules sealed electrode sensors work well even in solutions containing numerous elements.

Sensor specification

Concentration Range:	*5 x 10^{-6} to 1 M (0. 4-79,900 ppm)*
Resolution (12-bit):	0.15 mV
Minimum Sample Size:	5 mL in a 50 mL beaker
Default Sample Rate	10 samples per second
pH Range:	1 to 12 pH
Temperature Range :	0 to 80 °C
Reproducibility :	± 4%
Electrode Resistance	Less than 1 MΩ
Interfering Ions	CN^-, Cl^-, I^-, S^{2-}, and NH_3

Note: Sensor cables sold separately

Contents

The Bromide Sealed Electrode Sensor comes equipped with:

- The Bromide Sealed Electrode Sensor
- ISE (Ion Selective Electrode) Amplifier
- 1 oz. Br^- Ionic Strength Adjuster (ISA)
- 1 oz. Br^- 1000 ppm as Br^- Standard

Solutions

ISA 5M NaNO3: 425 g NaNO3 in 1000 mL DI water

10ppm Br^- (0.000125 M Br^-): Dissolve 12.88 mg NaBr in DI water and dilute to 1000 mL

1000ppm Br^- (0.0125 M Br^-): dissolve 1.288 g NaBr in DI water and dilute to 1000 mL

Experimental set up

Electrode Preparation

1. Remove the plastic protective vial from the tip of the electrode and gently shake the electrode downward like a thermometer to remove any air bubbles trapped inside. Caution: **Do not touch the sensing element with your fingers.**
2. Rinse the electrode with DI water, blot dry. **Do not rub dry.**
3. Condition the electrode in 10 ppm as Br standard solution for 30 minutes.
4. After the conditioning period, rinse the tip of the electrode with DI water and blot dry.
5. The electrode is now ready to use.

This sensor must be calibrated before use (see the **Data Logging, Calibrating and Analysis** below).

Two solutions of different concentrations (depending on the range of measurements) are used to calibrate the electrode. ISA is added to all solutions to ensure that the samples and the standards have the same ionic strength.

In addition to the aforementioned contents you will also need:

- Wash Bottle with Distilled (Dl) or deionized water.
- Several clean beakers.
- 1mL, 10mL pipettes.

Data logging, Calibrating and Analysis

MiLAB™ Android & IOS

1. Take your einstein™ Tablet or pair your einstein™LabMate™ with your Android or iOS tablet via Bluetooth
2. Insert the electrode into the ISE amplifier
3. Insert the ISE amplifier cable into one of the sensor ports
4. Launch MiLAB
5. MiLAB will automatically detect the ISE amplifier and show it in the Launcher View
6. Tap ISE amplifier and select the Bromide electrode

7. Make sure the icon is checked ( ) to enable it for logging

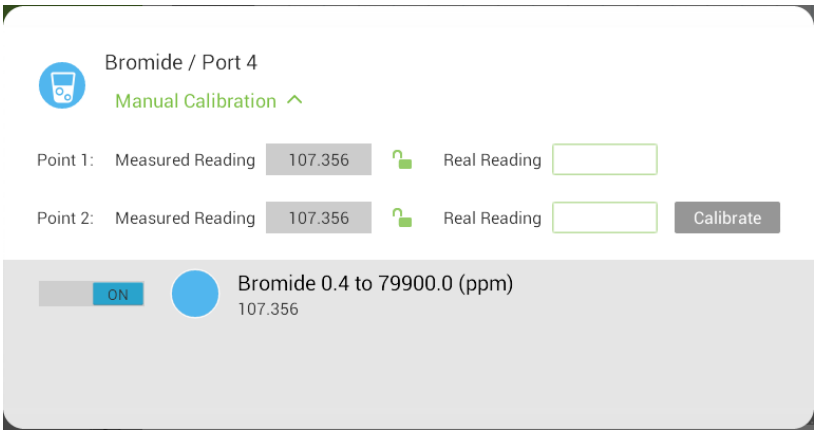
Calibration in MiLAB™

Preparing the calibration solutions

1. Add 10 mL of the 10 ppm solution into a 50 mL beaker.
2. Add 0.2 mL of ISA and stir thoroughly.
3. Add 10 mL of the 1000 ppm solution into a 50 mL beaker.
4. Add 0.2 mL of ISA and stir thoroughly.

Calibrating the sensor

1. Tap the Settings button next to the sensor's name and tap "Manual Calibration"



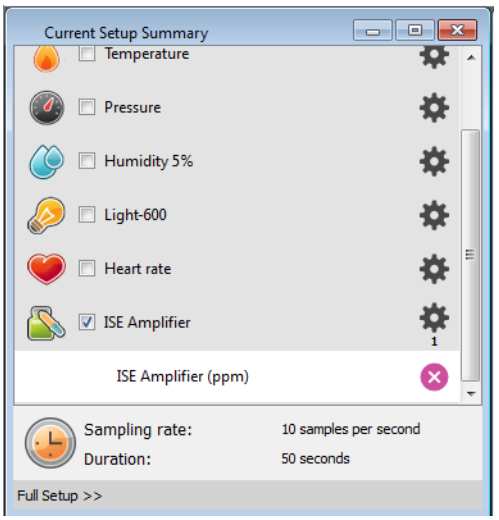
2. Prepare the electrode as described in “Electrode preparation” above
3. Tap the “Real Reading” box of Point 1
4. Enter the value “10”
5. Rinse the electrode with DI water, blot dry and place in the beaker with the 10 ppm solution. Wait for a stable reading, and then tap the “Lock” icon
6. Tap the “Real Reading” box of Point 2
7. Enter the value “1000”
8. Rinse the electrode with DI water, blot dry and place in the beaker with the 1000 ppm solution. Wait for a stable reading, and then tap the “Lock” icon
9. Tap “Calibrate”
10. You are ready to run your experiment

Note: It is best to calibrate the electrode with one Real Reading below your expected reading and one Real Reading above your expected reading. For example if you expect a reading of around 100 ppm it is best to calibrate with one Real Reading below 100 ppm and one Real Reading above 100 ppm

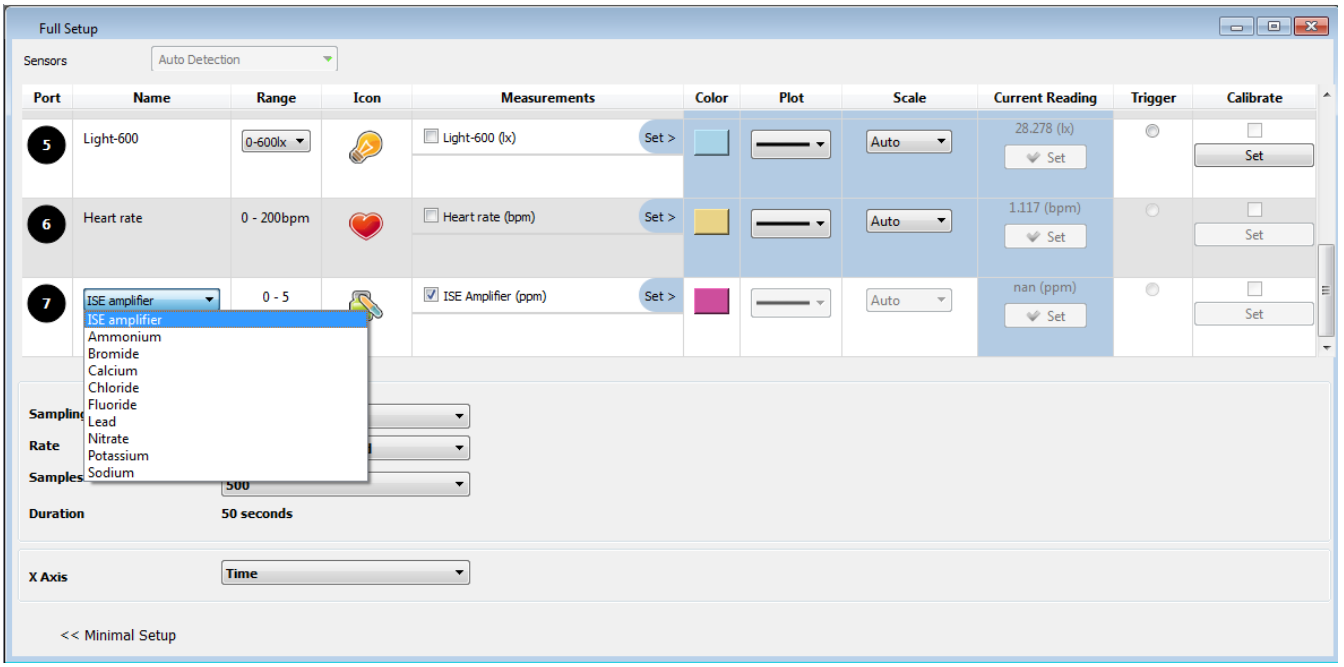
Note: You can prepare your own ppm solutions for calibration, using the strength of your solution as the “Real Reading”

MiLAB™ Desktop

1. Pair your einstein™LabMate™ with your PC, MAC, or Linux machine via Bluetooth, or connect it via the USB cable (found in the einstein™LabMate™ box).
2. Insert the electrode into the ISE amplifier
3. Insert the ISE amplifier cable into one of the sensor ports
4. Launch MiLAB
5. MiLAB will automatically detect the ISE amplifier and show it in the **Current Setup Summary** window



6. Click **Full Setup**, located at the bottom of the **Current Setup Summary** window to set which ISE electrode you are using and to program the data logger's sample rate, number of samples, units of measurement, and other options



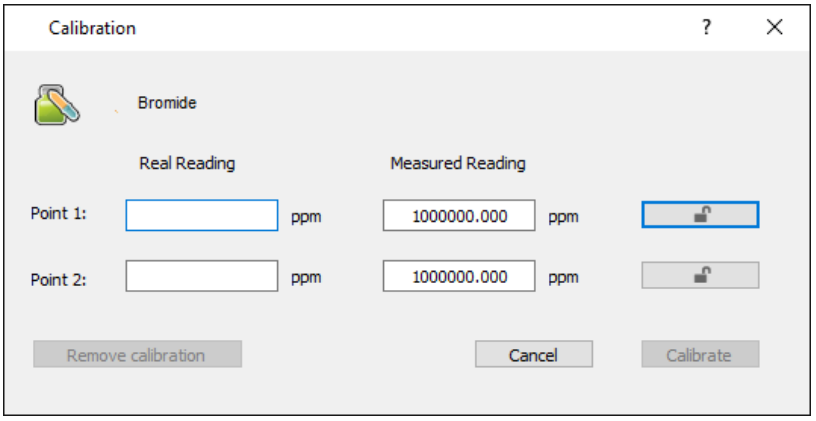
Calibrating in MiLAB™ Desktop

Preparing the calibration solutions

1. Add 10 mL of the 10 ppm solution into a 50 mL beaker
2. Add 0.2 mL of ISA and stir thoroughly
3. Add 10 mL of the 1000 ppm solution into a 50 mL beaker
4. Add 0.2 mL of ISA and stir thoroughly

1. Start MiLAB™ ( ) and select the Bromide electrode as described above.

2. Under the Calibrate column tap “Set” to bring up the Calibration menu



3. Prepare the electrode as described in “Electrode preparation” above.
4. Tap the “Real Reading” box of Point 1
5. Enter the value “10”
6. Rinse the electrode with DI water, blot dry and place in the beaker with the 10 ppm . Wait for a stable reading, and then click the “Lock” icon
7. Tap the “Real Reading” box of Point 2
8. Enter the value “1000”
9. Rinse the electrode with DI water, blot dry and place in the beaker with the 1000 ppm solution. Wait for a stable reading, and then click the “Lock” icon
10. Click “Calibrate”
11. Tap the Run button ( )on the main toolbar of the Launcher View to start logging

Note: It is best to calibrate the electrode with one Real Reading below your expected reading and one Real Reading above your expected reading. For example if you expect a reading of around 100 ppm it is best to calibrate with one Real Reading below 100 ppm and one Real Reading above 100 ppm

Note: You can prepare your own ppm solutions for calibration, using the strength of your solution as the “Real Reading”

Maintenance and Electrode Storage

Short Term:

Rinse the electrode thoroughly with Dl water and place the tip in a diluted standard solution (10 ppm) between measurements.

Long Term:

Rinse the electrode thoroughly with Dl water, blot and store dry. Replace the cap to protect the sensing element.

Follow procedures in the sections **Electrode Preparation** before using the electrode again.

Troubleshooting

If the electrode slope is not within the normal range, the following procedure may restore the electrode.

1. Soak the electrode in the 10 ppm as Br standard solution for 2 hours before us
2. Repeat the procedure outlined Electrode Preparation again.

Technical support

For technical support, you can contact the Fourier Education's technical support team at:
Web: www.einsteinworld.com/support
Email: support@fourieredu.com

Copyright and Warranty

All standard Fourier Systems sensors carry a one (1) year warranty, which states that for a period of twelve months after the date of delivery to you, it will be substantially free from significant defects in materials and workmanship.
This warranty does not cover breakage of the product caused by misuse or abuse.
This warranty does not cover Fourier Systems consumables such as electrodes, batteries, EKG stickers, cuvettes and storage solutions or buffers.