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BVT TECHNOLOGIES, a.s.

ELECTROCHEMICAL SENSORS AND DEVICES

New Conductivity Sensor CC4

Autumn 2022

www.bvt.cz

Dear customers,

We are pleased to inform you about our new Conductivity Sensor the CC4.

„Electrochemical sensors and biosensors can be effectively used for biochemical activity measurement.“

Dr. Jan Krejci, CEO

Front of Sensor

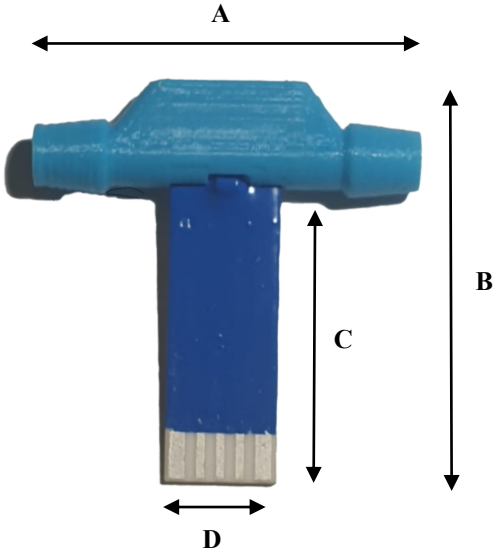
Back of Sensor

Uses of the CC4 Conductivity Sensor

The CC4 conductivity sensor has many uses, and we will list some here to give a good understanding of what it can be used for.

- **Checking the quality of distillation.**
- **Control of water quality in labs (distilled water must have low conductivity)**
- **Control of dialysing solution during dialysis in Kidney Failure Treatment.**
- **Checking of waste waters from treatment plants, i.e. checking of Salt Content**
- **Checking of water from old mines.**
- **Checking of water conductivity in Hydroelectric Dams; if the conductivity will be high, there is a risk of damage to the Dams mechanical parts and the structure.**

CC4 Dimensions



A— 25.1mm

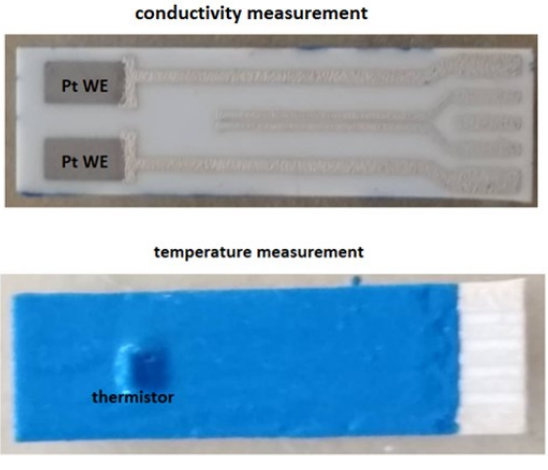
B—26.3mm

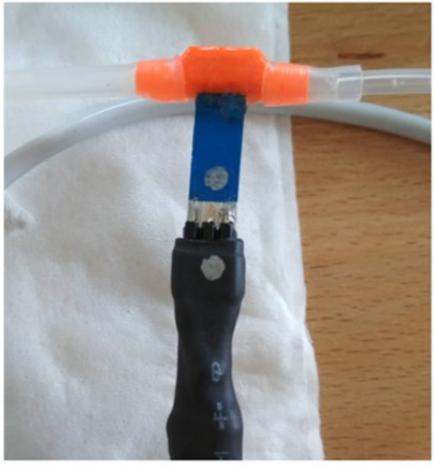
C—19.3mm

D—7.26mm

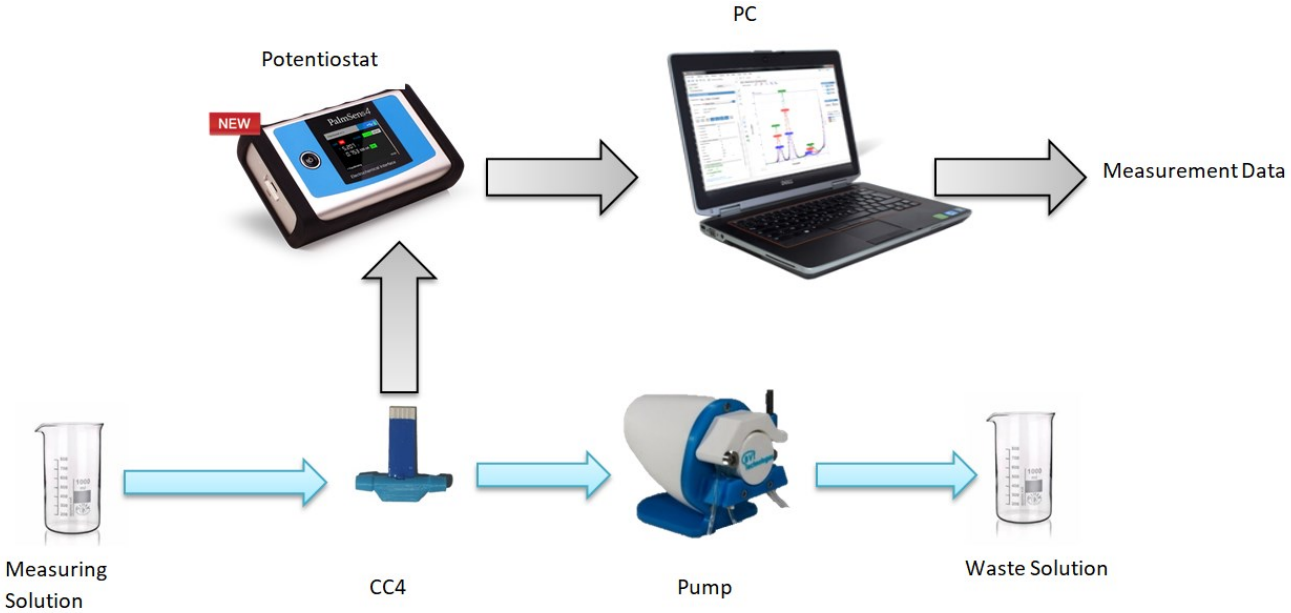
CC4 Basic Structure

The Basic Structure of the CC4 is as shown Below. The Structure consists of two Platinum Working Electrodes (Pt WE) and an integrated Thermistor on the opposite side covered by a Dielectric Layer. This Sensor is then integrated with a specialised Cell to create the CC4.

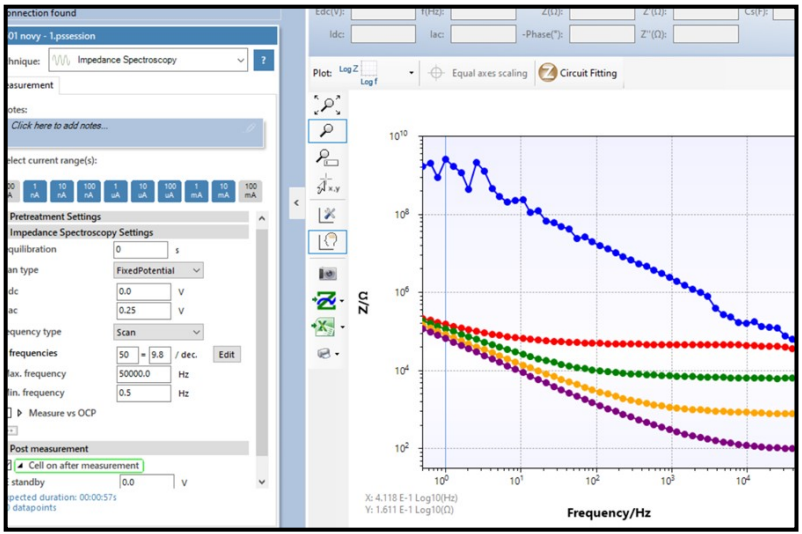




Example CC4 Measurement Setup



Measurement Software Setup



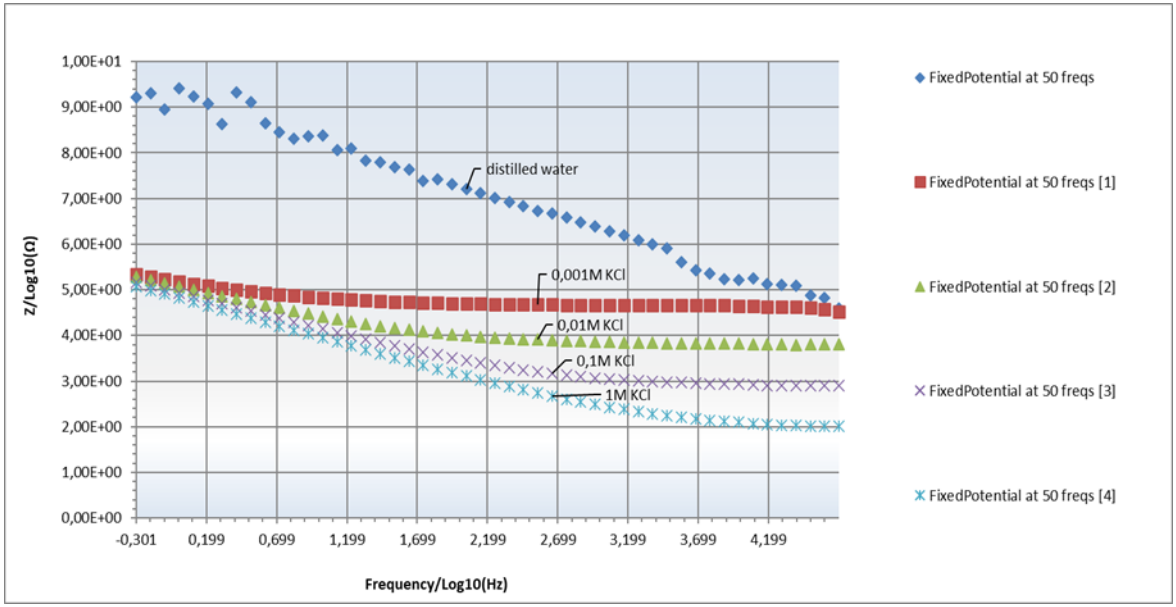
Recording in PSTrace 5.7, impedance spectroscopy measurement method

The measured electroimpedance spectroscopy (EIS) records from PSTrace 5.7 (dependence of log resistance [Ω] vs.log frequency [Hz]) were transferred to MSExcel.

In the measured records, the area of a constant signal at a frequency value of 20 kHz was determined (corresponds to the measured point of the log frequency of 4.2924).
The subtracted value of the resistance [Ω] corresponding to this frequency was subsequently converted to an electrical conductance of 1/R [S].

The result is the calibration curve of the sensors, as the dependence of the measured electrical conductance of the sensor 1/R [S] in four calibration solutions KCl 1; 0,1; 0,01 and 0,001 mol/l on the specific conductivity of KCl [S/m] standards [1, 2]. From the slope of the calibration curves of the sensors, the cell constant of the sensor is determined, allowing the measurement of conductivity [S/m] in unknown solutions.

Electrical conductance of the sensor (at a frequency of 20 kHz) on the specific conductivity of KCl calibration solutions



Sample of measured EIS recording of sensor 1 in PSTrace

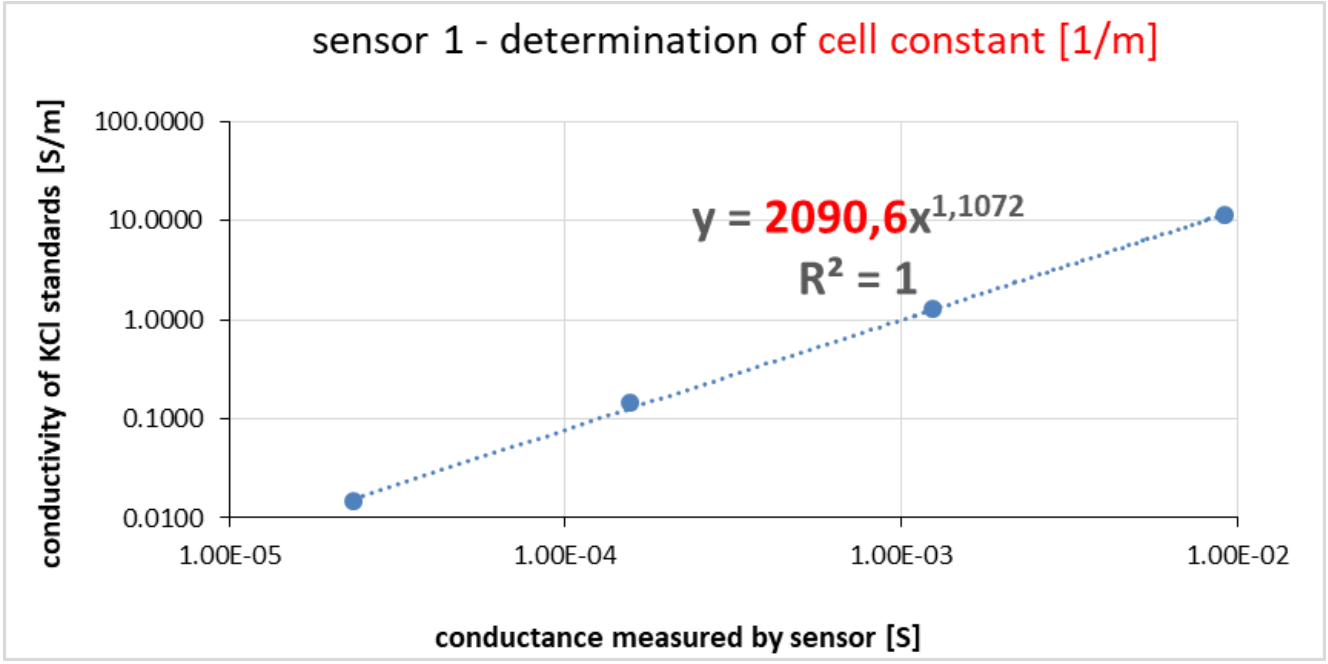
Evaluation in Excel

Results

Electrical conductance of the sensor (at a frequency of 20 kHz) on the specific conductivity of KCl calibration solutions

Electric conductance 1/R [S]	Concentration KCl [mol/l]	Conductivity of KCl standards [S/m]
2.3623E-05	0,001	0,0147
1.5710E-04	0,01	0,1413
1.2468E-03	0,1	1,2880
9.1809E-03	1	11,1680

Cell constant for sensor 1 (marked red)



References

[1] RIEGER, Philip H. Electrochemistry. Englewood Cliffs, New Jersey 07632: Prentice-Hall, 1987. ISBN 0-13-248907-4.

[2] Bard, Allen J.. “Electrochemical methods : fundamentals and applictions / Allen J. Bard, Larry R. Faulkner.” (1980).

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