CATALOGUE 2023, BVT Technologies, a.s.

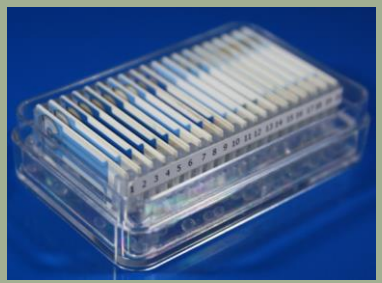
We are pleased to inform you about our new Conductivity Sensor the CC4. and our new Screen printed sensor using the SIRE technology (concept of soluble enzymes) !

Do not hesitate to contact us for more information!

E-mail: info@bvt.cz, **Tel.:** +420 775 605 538

Visit our website www.bvt.cz

Follow us on Facebook

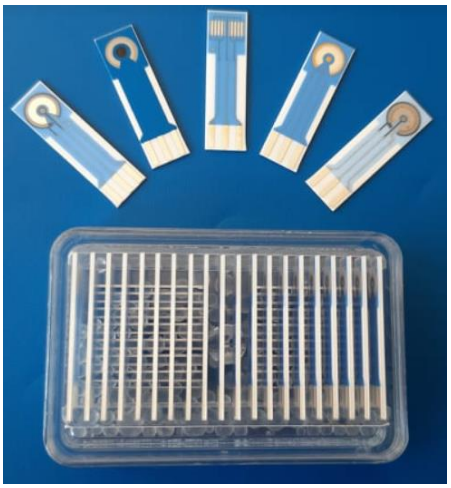


BVT PRODUCTS

- ELECTROCHEMICAL SENSORS AND BIOSENSORS
  - screen printed electrodes
- ELECTRODES
- STIRRERS
- CABLES AND CONNECTORS
- MANUAL SCREEN PRINTER
- CELLS
- POTENTIOSTATS
- MINITHERMOSTAT
- PUMPS
- ACCESSORIES

STANDARD SPECIFICATION OF SENSORS

Electrochemical Screen-Printed Sensors (SPEs) are important tools for routine analysis in various fields of electro-analytical chemistry. Knowledge of specific features enables the **optimum choice of a sensor** for the required application.



BVT created some **standard description of (SPEs) sensors**.
It enables easy navigation on the sensors and the possibilities they offer.

The formula AC1*.W*.R* (*)
is composed of a two letters code followed by a numeral, followed by specification of working and reference electrodes and possibly some accessories.

- The **first letter characterizes the electrochemical method** which is **suitable for this sensor**. (**A**... amperometry, **C**…conductometry,…).
- The **second letter describes a substrate on which a sensor is printed.** (**C**... ceramics (typically alumina ceramics), **P**…plastic or **G**…glass).
  It is also possible to use some special material such as boron nitride ceramic or beryllium ceramics.
- The **number following the second letter characterize the topology of the sensor.** (for example sensors AC**1**, AC**2**, CC**1**, CC**2** …). By this the basic materials of the sensors and their topology are defined.
- The **third letter W*** specifies the **working electrode**. **The number following the third letter specifies the working electrode material**.

  (W**S** – standard material, W**1** - pure gold, W**2** - pure platinum, W**3** - pure silver, W**4** and W**5** – printed or coated carbon (graphite)).
- Then **follows the description of the reference electrode R*** and the **number specifying its material**. (R**S** - silver, R**1** - a mixture of silver and silver chloride in a polymeric binder, R**2** - silver covered by AgCl.
- **(*) - Additional Technical specification** (**H** – Heating of the sensor, **T** – Temperature sensing element)

DIAMETER of WE

The sensors are formed on a corundum ceramic base. On to this surface the working, the reference and the auxiliary electrodes are applied. The working and the auxiliary electrodes are made of a variety of materials (WS=Au+Pt alloy, W1=Au, W2=Pt, W3 = Ag, W4= carbon (graphite), W5= manually microdispensed carbon (graphite) and Au+Pt alloy AUX).

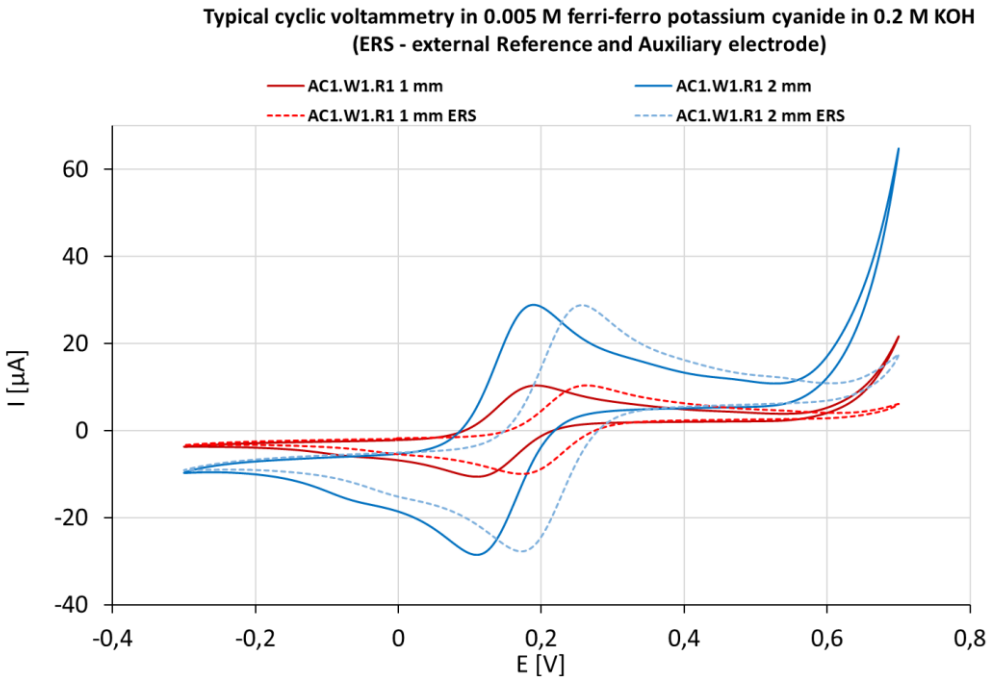
The materials as Zn, Al, Cu, Mg, ...can be used for working electrode on special demand.

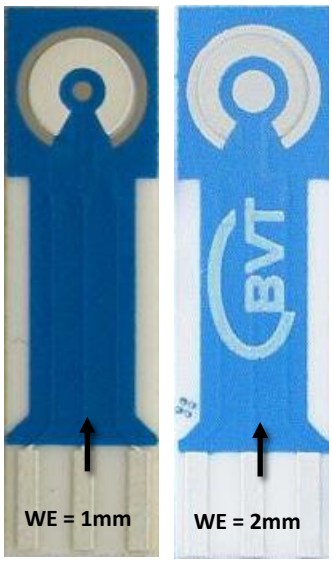
SENSOR AC1.W*.R*, Diameter of WE is 1 mm

Basic amperometric low cost three-electrode sensor.
Dimensions: 25.4 x 7.26 x 0.63 mm

SENSOR AC1.W*.R*, Diameter of WE is 2 mm

Basic amperometric low cost three-electrode sensor with patented structure .
Dimensions: 25.4 x 7.26 x 0.63 mm



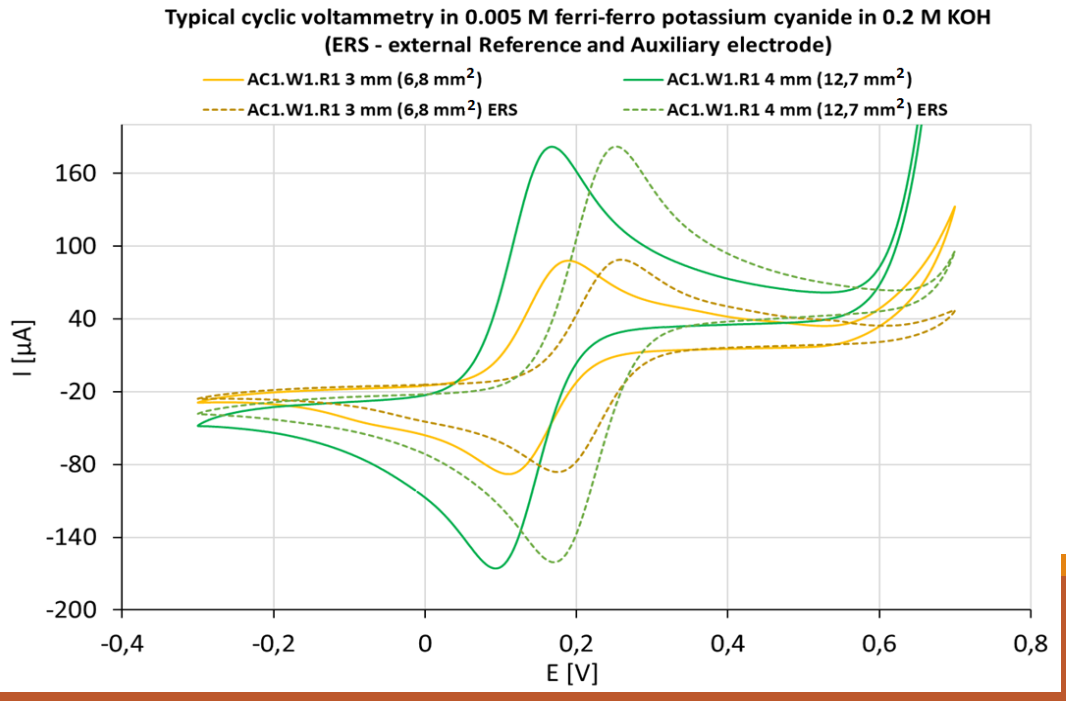


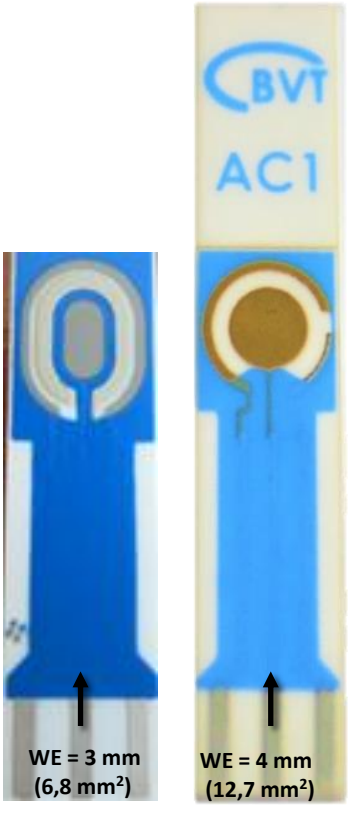
SENSOR AC1.W*.R*, Diameter of WE area is 3 mm (6,8 mm²)

Basic amperometric low cost three-electrode sensor with patented structure .
Dimensions: 25.4 x 7.26 x 0.63 mm

SENSOR AC1.W*.R*, Diameter of WE area is 4 mm (12,7 mm²)

Basic amperometric low cost three-electrode sensor with patented structure .
Dimensions: 25.4 x 7.26 x 0.63 mm





DIAMETER of WE

The geometrical active surface of sensors lies in range +/- 10 %.
Bigger active surface has better geometrical accurancy. The sensors quality is controlled statistically.
It is possible to deliver sensors with lower parameters variability.

Image of AC1.W1.RS sensor electrodes under a microscope

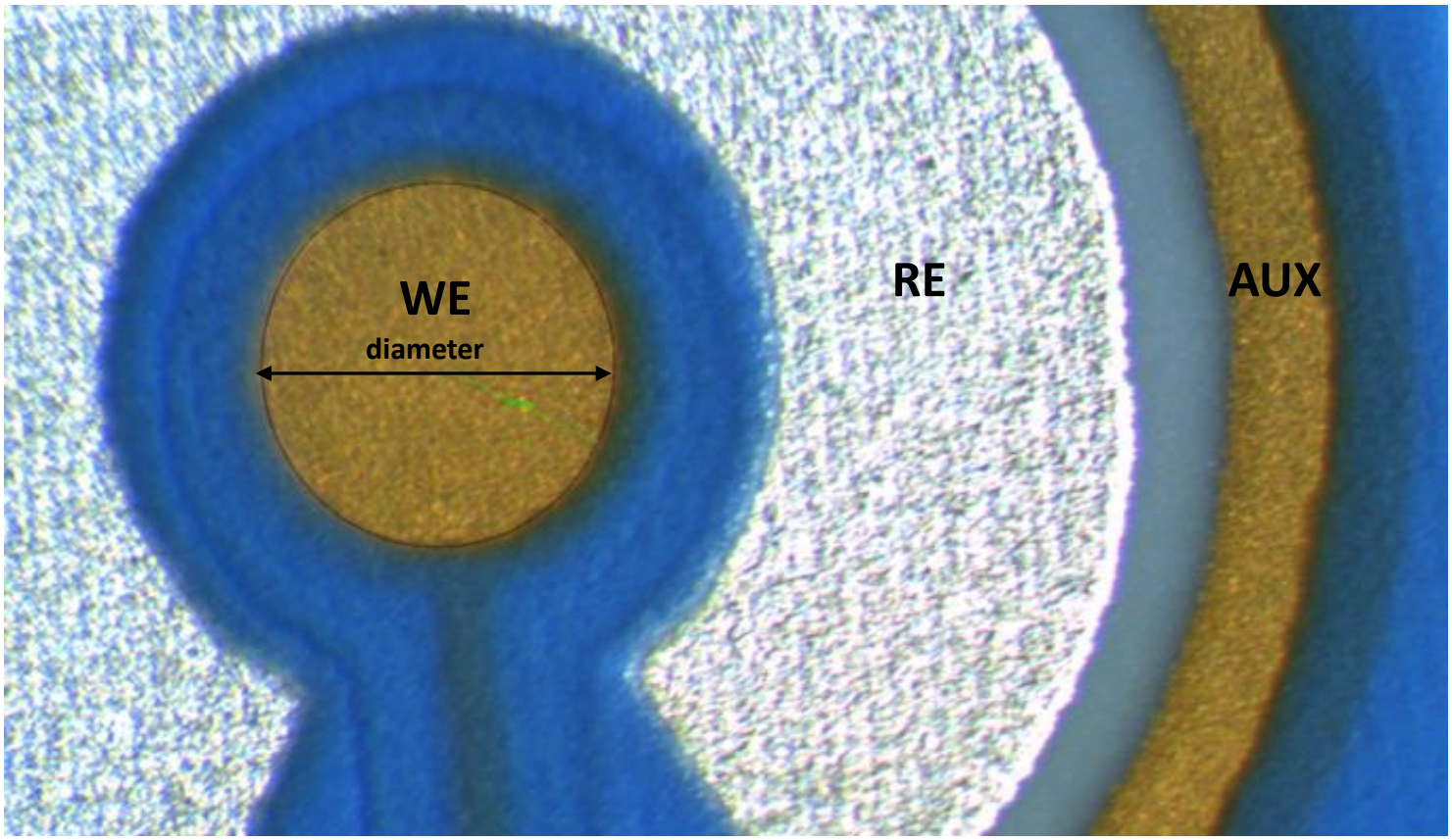
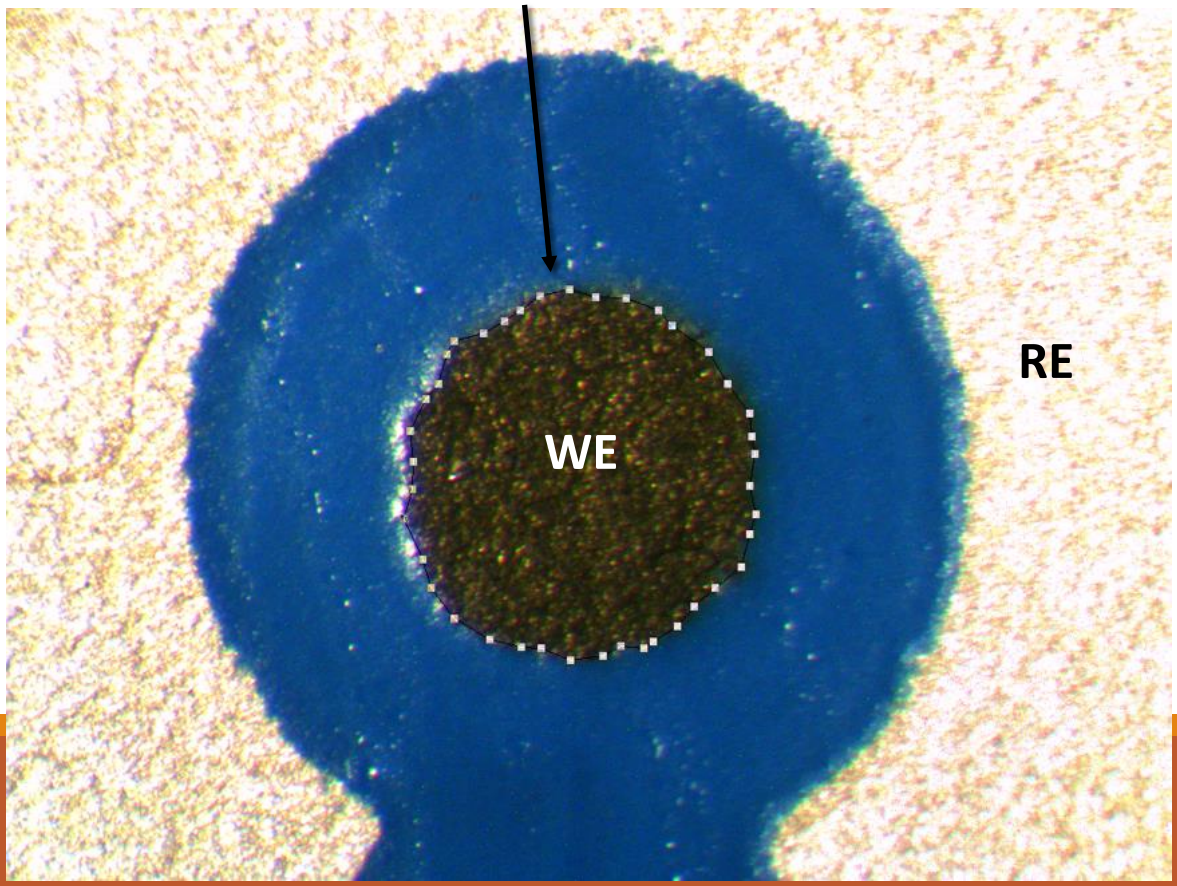


Image of AC1.W4.R1 sensor electrodes under a microscope

- detail from the measurement of the geometric surface of the carbon (graphite) working electrode



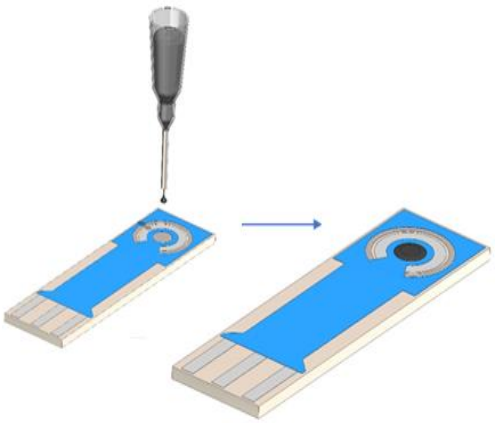
W4 and W5 – CARBON (GRAPHITE) SENSORS

Active layer can be created by printing (W4) or microdispensing (W5).

AC1.W4. with screen printed graphite WE and AUX

The resulting printed layer has a working and auxiliary electrode made of carbon (graphite), the dielectric layer is made of polymer

- printed carbon (graphite) working electrode has better properties in terms of surface reproducibility but has greater resistance between the electrode and the measuring device. The polymeric binder of active layer has limited resistance to organic solvents and sonification.



AC1.W5. with manually microdispensed graphite WE (Au+Pt alloy AUX)

The coated layer is made by microdispersing. It has only a working electrode made of graphite, the auxiliary electrode is made of another material (Au+Pt alloy), the dielectric is usually ceramic. The polymeric binder of the active layer has limited resistance to organic solvents and sonification.

- manually applied working graphite electrode **(a precise amount of Carbon (Graphite) is applied as drop, by a specialised syringe)** has better properties in terms of conductivity between the active surface and the input of the device, but it is not possible to ensure reproducibility of the surface in same level as in screen printing.

The active layer can be aslo prepared from glassy carbon powder, carbon nanotubes and other carbon related materials.

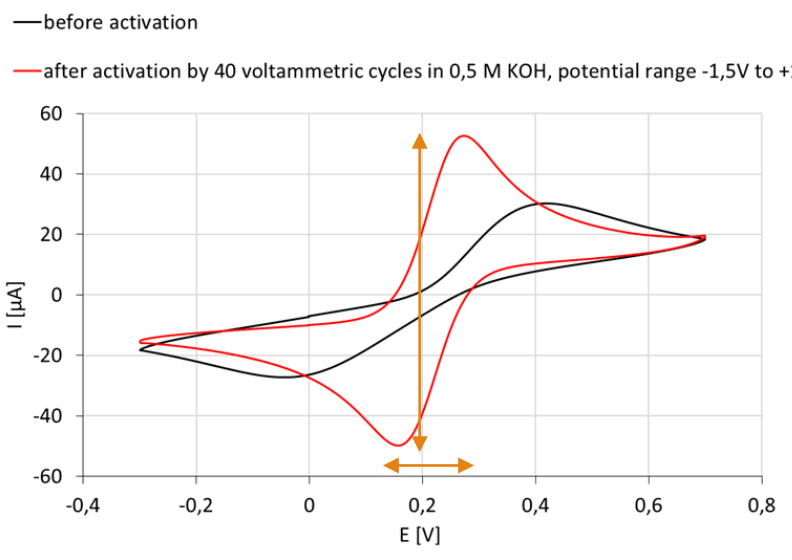
ACTIVATION OF SENSORS

To achieve better results, it is recommended to activate the graphite sensors before the measurement. BVT offers unactivated version of sensors. Activation is performed by the customers themselves.

The activation method depends on the intended use of the sensors, the measured substance, etc.

Below is an **example of electrochemical activation of a carbon (graphite sensor) AC1.W4.RS (2 mm WE) using several voltammetric cycles in 0.5 M KOH.** After activation, we observe an increase in the response of the sensor I[µA] to the measured analyte and an accelerated electron transfer on the working electrode of the sensor, manifested by a lower voltage difference E[V] between the oxidation and reduction peaks of the sensor.

Typical cyclic voltammetry in 0.005 M ferri-ferro potassium cyanide in 0.2 M KOH (ERS - external Reference and Auxiliary electrode)



Measurement specification:
- Cyclic voltammetry, scan rate: 50 mV/s
- Temperature: 20 °C
- Working electrode: sensor AC1.W4.RS 2mm

All Measurements (activation of sensor working electrode and cyclic voltammetry) done with ERS (external reference system - stable)
1. Reference electrode: RCEc.RS.R5 (external Ag/AgCl electrode (filled with 1M KCl)
2. Auxiliary electrode: sensor ACEc

Chemicals:
- KCl: 1M KCl
- FeFe: 0.005M $K_3[Fe(CN)_6]$ + 0.005M $K_4[Fe(CN)_6]$ in 0.2M KOH

BVT BIOSENSORS

A bio-chemically active substance can be immobilised on the working electrode of the sensor to create a biosensor:

BVT offers:

- **Glucose-oxidase (AC1.GOD) sensor**

Amperometric Glucose Oxidase three-electrode sensor with patented structure made by thick film technology
Dimensions: 25.4 x 7.26 x 0.63 mm
WE material: Pt

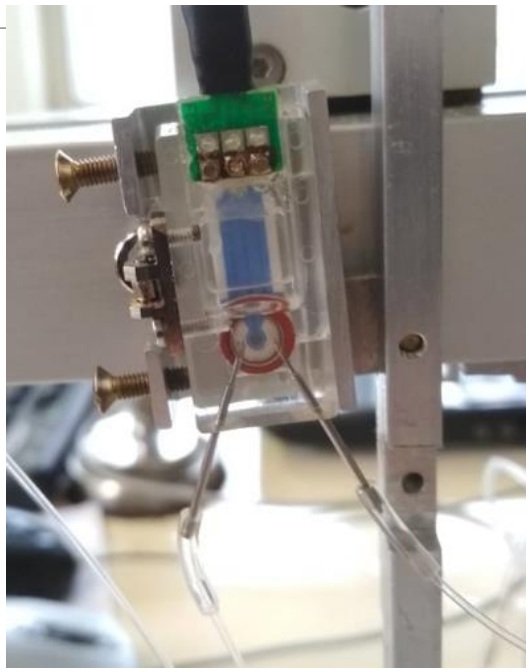
Glucose Oxidase (GOD) from *Aspergillus Niger* is immobilized on the active surface of a working electrode of amperometric substrate AC1.W2.RS. The diameter of the immobilized bioactive membrane is 2 mm and the mean applied activity is 1 unit/mm^2.

- **Acetylcholinesterase (AC1.AChE) sensor**

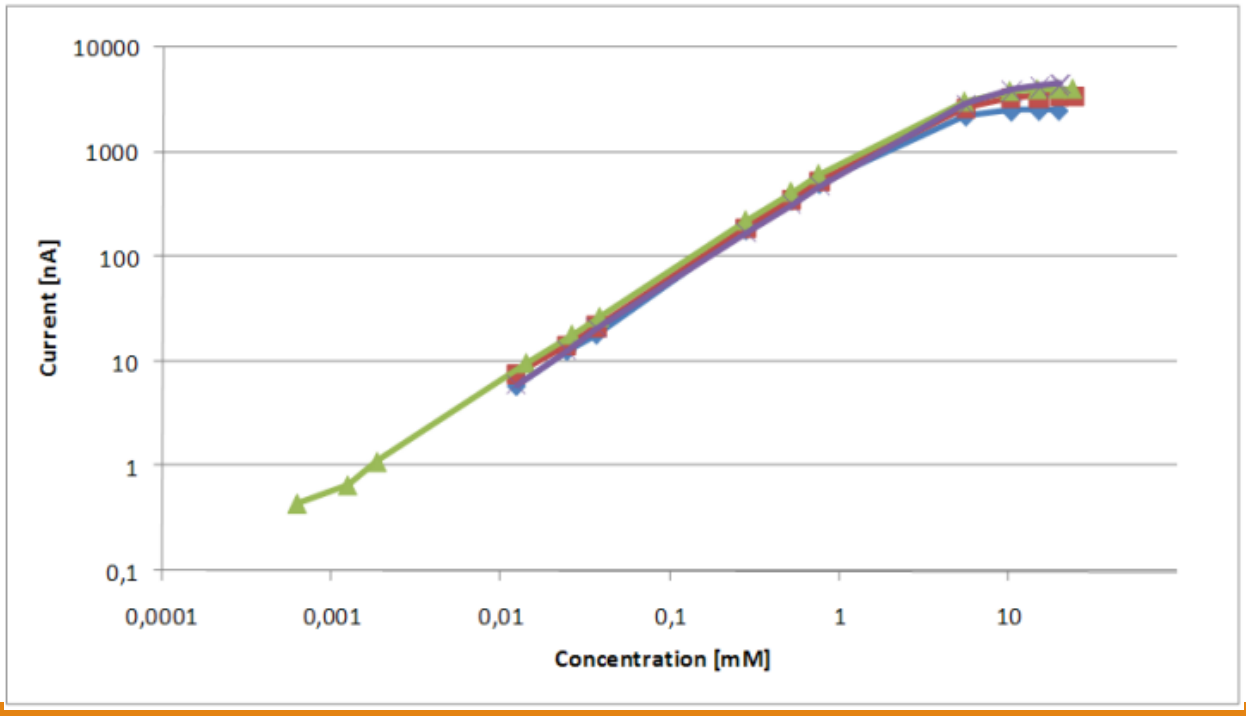
Amperometric Acetylcholinesterase three-electrode sensor with patented structure made by thick film technology
Dimensions: 25.4 x 7.26 x 0.63 mm
WE material: Pt

Acetylcholinesterase from electric eel type VI-S is immobilized on the active surface of a working electrode of electrochemical sensor AC1.W2.RS (i.e. Platinum working electrode, silver reference electrode). The diameter of the immobilized bioactive membrane is 2 mm and the mean applied activity is 1 unit/mm^2.

Possible **automation of the measurement after inserting the AC1.GOD sensor into the flow cell FC2.**
Sample supply to the sensor by diffusion injection analysis



Electrochemical measurement of glucose using AC1.GOD sensor with immobilized glucose oxidase enzyme - example of a Calibration curve



SENSORS chemical RESISTANCE

POLYMER VS CERAMIC DIELECTRIC PROTECTION LAYERS

Please note that each material has different mechanical and chemical resistance.
Polymer layers are cured at low temperatures and they have limited resistance to temperature and organic solvents. They are resistant against bases and acids.

Ceramic layers are fired in temperatures more than 850°C. They have excellent resistance against temperature and organic solvents. They have lover resistance against acids and bases.

WORKING ELECTRODE MADE OF PURE METALS CAN HAVE LOVER ADHESION

WS – Au+Pt alloy:

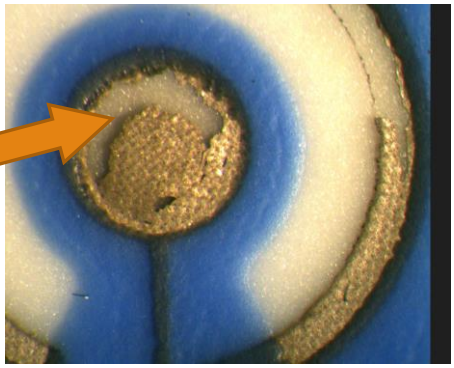
The active layer is from Au+Pt alloy. Main advantage – good adhesion and chemical resistance.

W1 – Au:

The active layer is pure Au.

W2 – Pt:

The active layer is pure Pt. This **layer can be destroyed by sonification, current over 10 mA and mechanical cleaning**.



W3 – Ag:

The active layer is Ag

W4 and W5 – carbon (graphite):

The active layer is carbon (grapite) (screen printed or microdispersed) in polymeric binder. Polymeric binder of active layer has **limited resistance to organic solvents and sonification**.

PLEASE NOTE THAT EACH MATERIAL OF RE HAS DIFFERENT MECHANICAL AND CHEMICAL PROPERTIES

RS – Ag:

Ag reference electrode with additives for better adhesion. Reference layer is partially covered by ceramic dielectric layer which is fired in temperatures more than 850°C. They have excellent resistance against temperature and organic solvents. They have lover resistance against acids and bases. The electrodes AC1.W*.RS can be heated up to 600°C (except of W4.RS and W5.RS).

R1 - 65% Ag + 35% AgCl (powder mixture in polymeric binder):

Ag/AgCl (65%:35%) reference electrode. Polymeric binder with limited resistance to organic solvents and sonification. Reference layer is covered by polymer dielectric layer which is cured at low temperatures. They have limited resistence to temperature and organic solvents. They are resistant against bases and acids. The electrodes AC1.W*.R1 can be heated to 150°C to approximateley 2 hours until significant change of parametres. The longer curing will cause reference electrode degradation.

R2 - Ag covered by AgCl electrolytically:

Ag reference electrode covered by AgCl electrolytically. The color of this layer can be from light to dark brown. This layer degrades under the influence of light. **If your measurement is sensitive to silver contamination, prefere R2 or RS.** The electrodes AC1.W*.R2 can be heated up to 300°C (except of W4.R2 and W5.R2).

INNOVATION IN ELECTRODES!

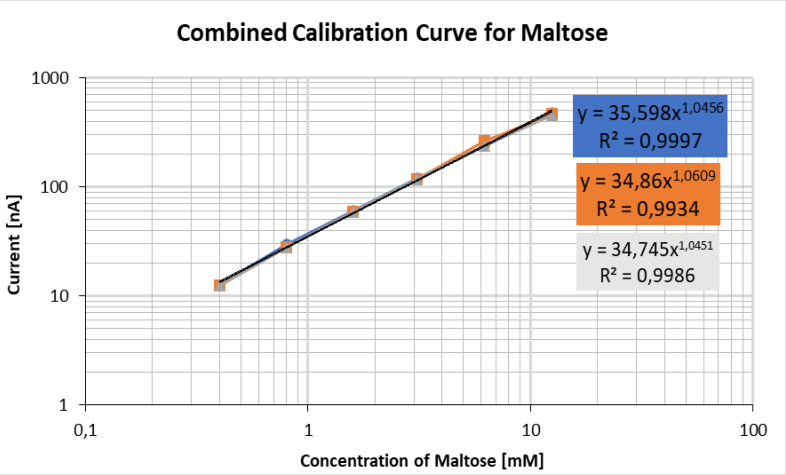
NEW!

Screen printed sensor using the SIRE technology (concept of soluble enzymes)

The **SIRE (Sensor with Injectable Recognition Element) technology** was developed by the Swedish Company Chemel [1]. BVT has acquired the SIRE technology and continues the development of this technology.

The original **SIRE sensor was miniaturized by Thick Film Technology (TFT)**.

The SIRE sensor uses the **concept of soluble enzymes into a reaction chamber** separated from the sample by a **semi permeable dialysis membrane**.
The **analyte**, in this case maltose, **enters into the reaction chamber by diffusion**. The **analyte reacts with the recognition enzymes** of **creating H_2O_2** which **is oxidized on screen printed Pt electrode. The current corresponds to the amount of analyte**.



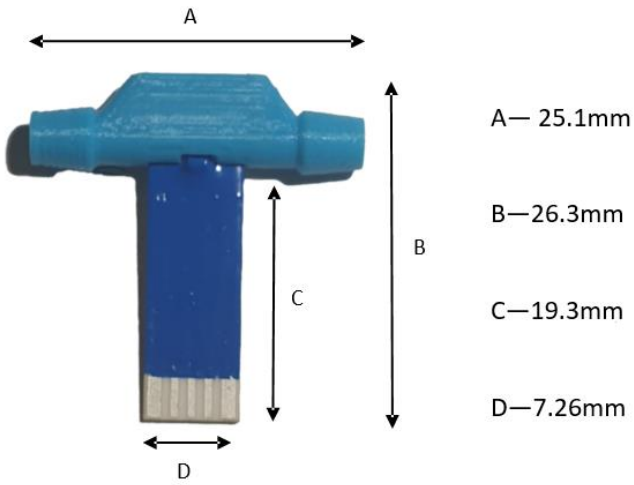
[1] KRIZ, Dario. *Use of a chemical sensor, Chemel AB: Amperometric enzyme electrodes for analytes in body fluids, e.g. glucose in blood*. US6214206B1. Uděleno October 23, 2000. Zapsáno June 19, 1997.

Acknowledgement:
Maltose sensor prototype was used in project: Modular technological unit for process control of brewing production; TRIO program; Project number FV30332

NEW!

Screen printed sensor CC4. for temperature and conductivity measurement

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.

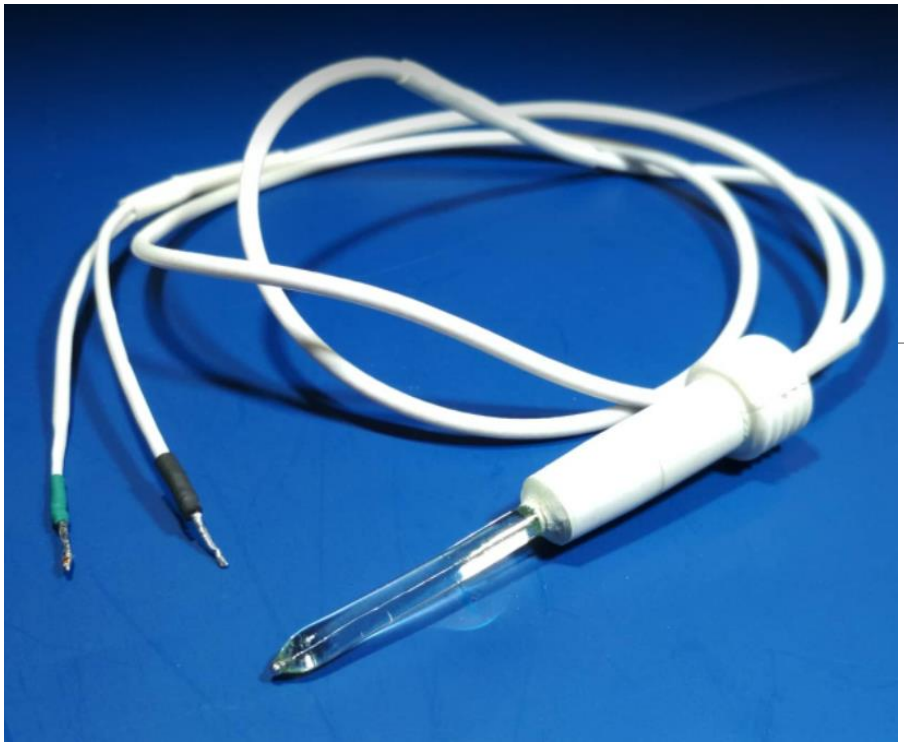


Can be used for:

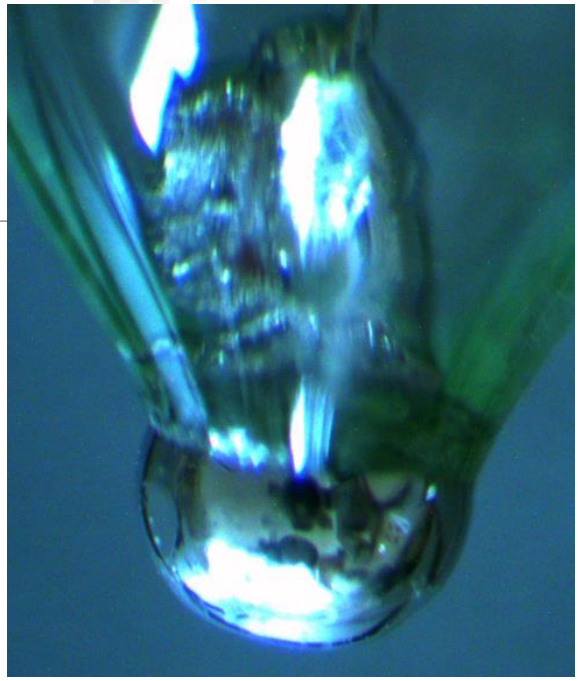
- Checking the quality of distillation.
- Control of water quality in labs
- Control of dialysing solution during dialysis in Kidney Failure Treatment.
- Checking of waste waters from treatment plants, i.e. checking of Salt
- Checking of water from old mines for the contamination of metals.
- Checking 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.

Hanging platinum drop electrode (HPDE)

NEW!



Hanging Pt drop electrode



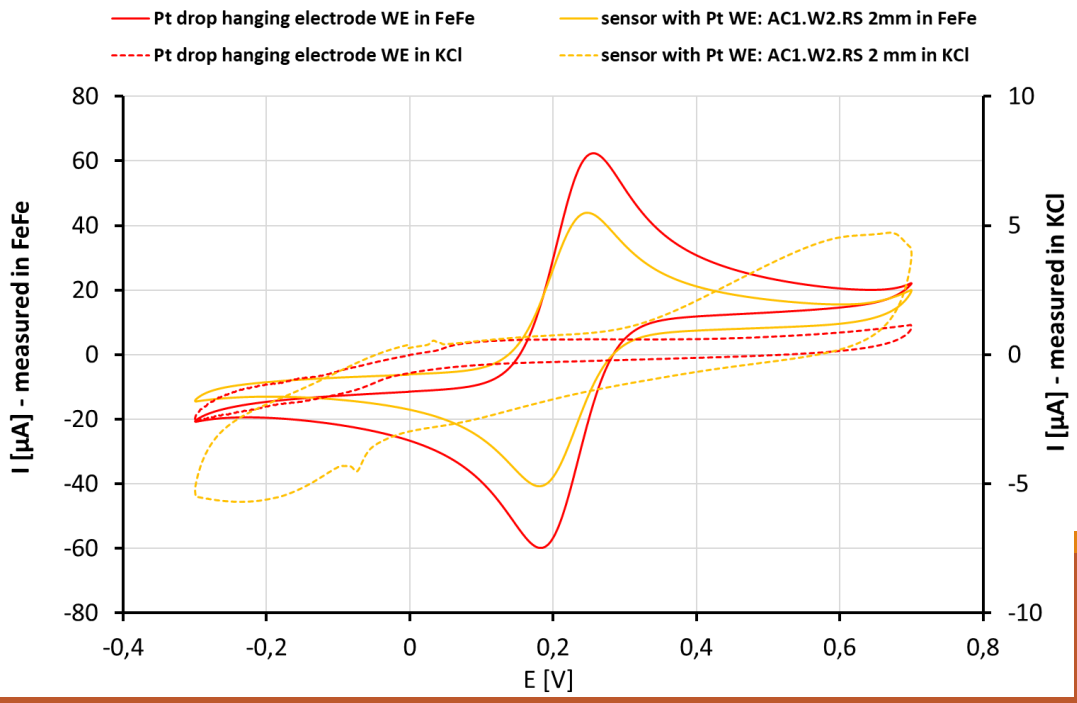
Hanging Pt drop electrode - detail

Hanging platinum drop electrode (HPDE) is solid phase alanogy of HMDE.
The drop of liquid Pt at 2000 °C forms a drop ot Pt. The surface of HPDE has nearly ideal surface which is impossible to obtain using polishing. HPDE has also spherical symmetry which enables mathematical treatment of its response.

The material is not toxic and it is chemically stable. The only disadvantage is HPDE cleaning, which can be, however, in some cases solved by carefull insertion of the electrode tip to the flame of alcohol burner.

Thus HPDE can be used as reference electrode for complicated electrochemical studies, where is necessary distinguish analytical signal from the signal generated by surface inhomogenities.

Example of cyclic voltammetry measurement in Ferri-Ferro potassium cyanide in 0.2 M KOH



Measurement specification:
- Scan rate: 50 mV/s
- Temperature: 20 °C
- Working electrode:

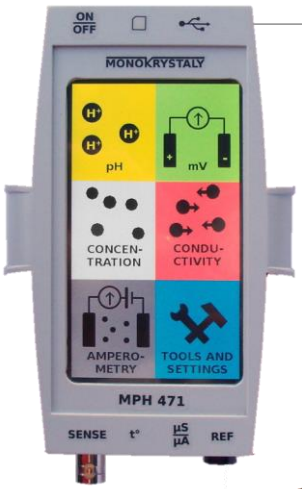
Pt drop hanging electrode
Sensor with Pt WE AC1.W2.RS 2 mm

All measurements performed with ERS (external reference system - stable)
1. Reference electrode: RCEc.RS.R5 (external Ag/AgCl electrode (filled with 1M KCl)
2. Auxiliary electrode: external Pt wire electrode ACEc

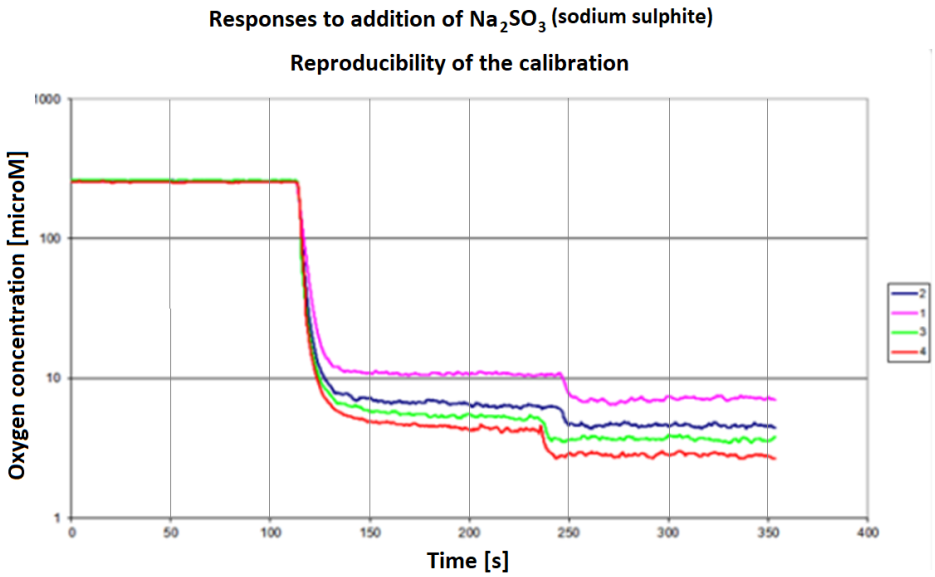
Chemicals:
- KCl: 1M KCl
- FeFe: 0.005M $K_3[Fe(CN)_6]$ + 0.005M $K_4[Fe(CN)_6]$ in 0.2M KOH

OXYGEN CONCENTRATION MEASUREMENT WITH Universal potentiostat MPH471

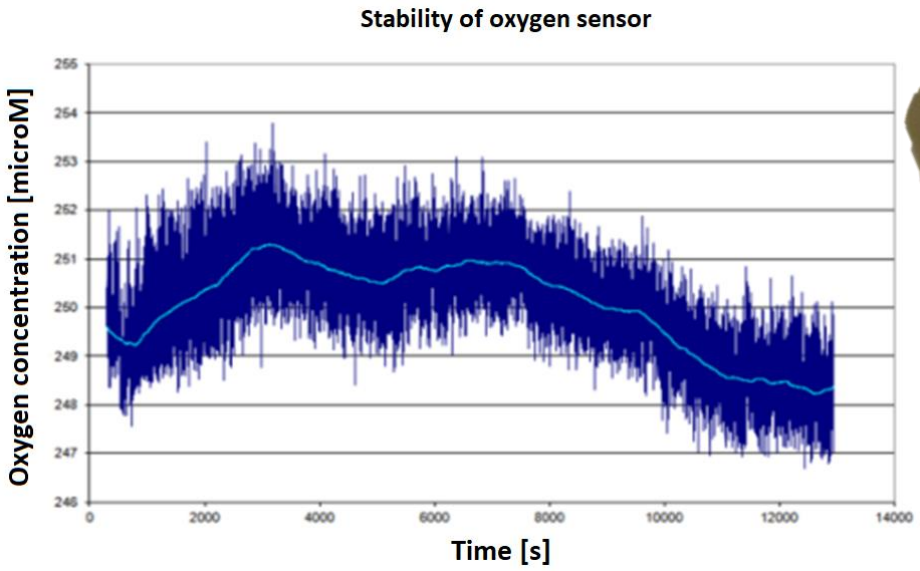
The instrument enables measurement of amperometry, potentiometry and conductometry. Communication with the computer is provided via USB or Bluetooth. This hand-held device is equipped with GPS navigation so the measured data may be enhanced by the exact coordinates of the location where the measurement was made. Measured data can be stored and later processed in a PC because of the SD card slot incorporation. The ability to record a waveforms or integrate the measure values is enabled.



NEW!



Basic evaluation methods are also implemented – linear and non-linear calibration and standard addition method is available. The influence of the type of oxygen electrode membrane, temperature or gas solubility can be compensated for the measured values. The measured data are automatically recalculated and displayed in units of current, voltage, concentration ($g \cdot l^{-1}$ or $mol \cdot l^{-1}$) or saturation. Potentiometric measurement allows connection of pH electrodes and ISE.



MAIN ADVANTAGES

- Battery life up to 200 hours
- Excellent tooling for analysts (graphs, unit conversions, internal standard method for potentiometry, coulometric titration, 10 Henry constants for various redox active gases)

Power and data communication via USB, Bluetooth, Data logging on a memory card

Up to 5-point calibration for ISE and pH electrodes, up to 4-point calibrations of the conductivity

LOW COST DUAL CHANNEL PERISTALTIC PUMP 2PP.T

The **peristaltic pump 2PP.T* is simple device for routine laboratory use**. The pump has two channels. The flow is in one direction. The lifetime of tubing is optimized to maximal value. The pulsation is minimized for flow cell FC2.

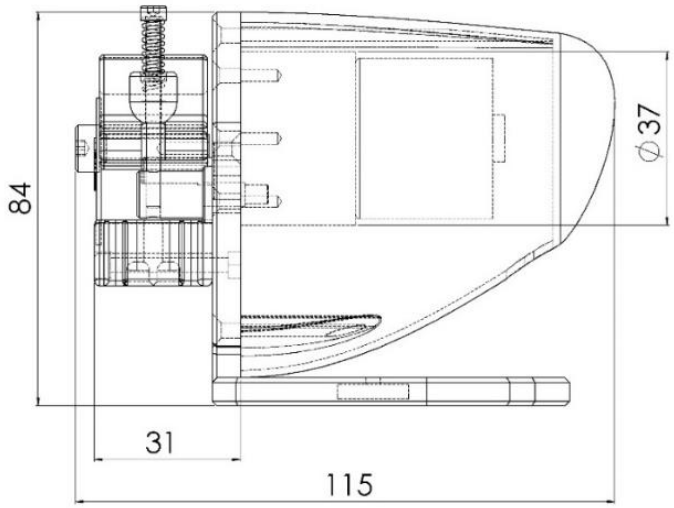
The pump is **supplied by max 12V**. The **rotation speed is controlled by voltage**. The control unit can be delivered with pump. The force on the tubing is adjusted by screw and spring. The pulsation damper can be ordered separately.

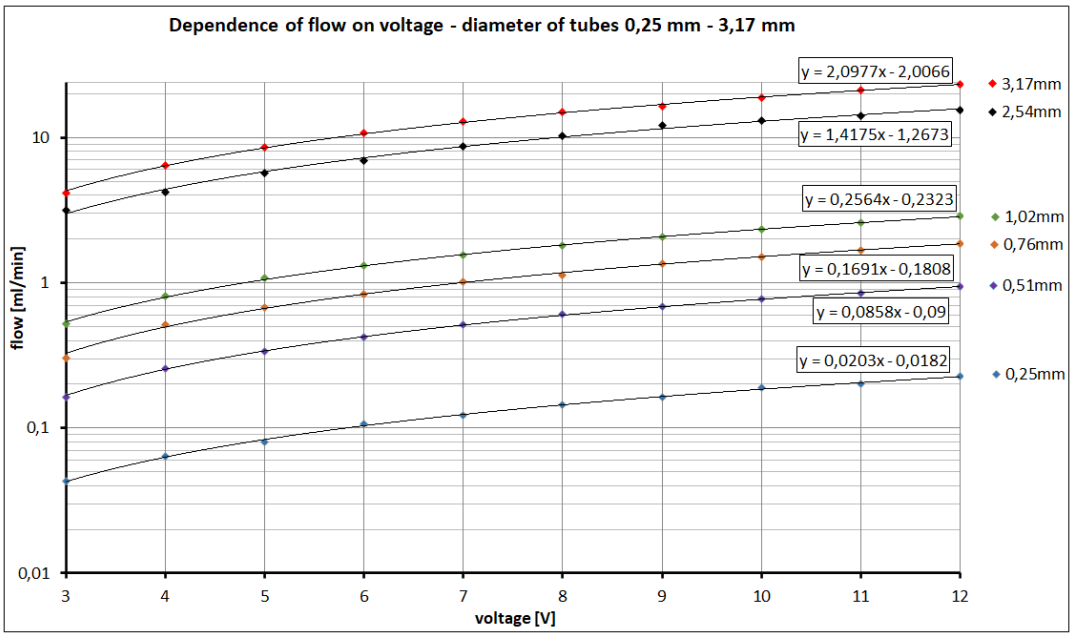
- The pump is provided with 2 spare tubing. Required diameter should be specified by customer: 0.25 mm, 0.51 mm, 0.76 mm, 1.02 mm, 2.54 mm or 3.17 mm.

Model	Dimensions			
	Length	Height	Width	Weight
2PP	115 mm	84 mm	74 mm	340 gms

Technical Parameters	2PP.TS
Double channel	•
4 rollers	•
Voltage: 3V-12V	•
Consumption: 150 mA - 220 mA - 600 mA (min - typical - max)	•
Starting current: 1000 mA (10 ms)	•
Flow in range: 10 - 15000µl/min	•

The integrated shaft enables fastening by standard laboratory clamps.

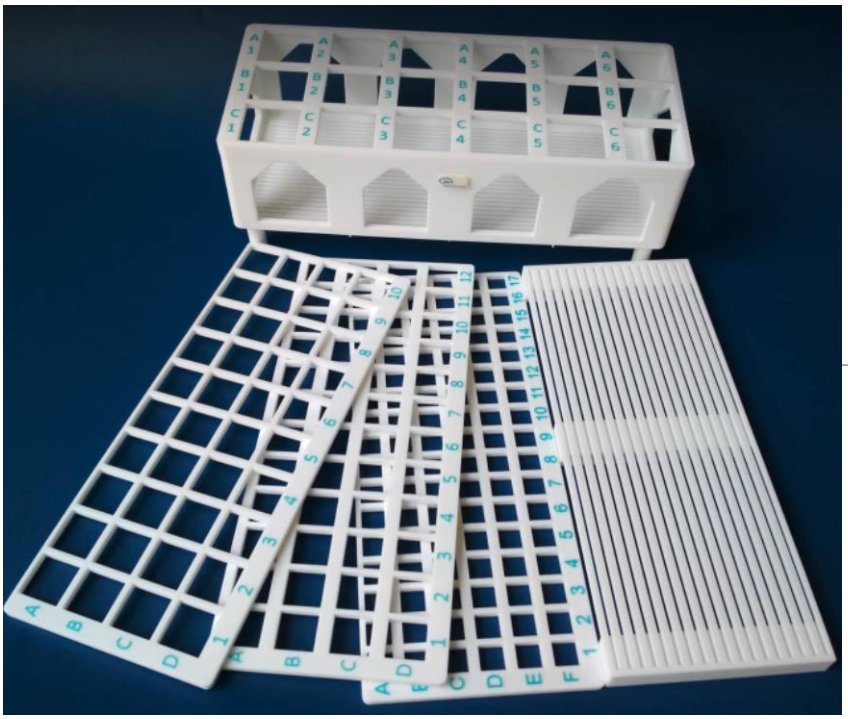


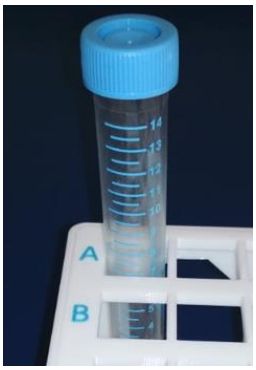


- Calibration curve
- Long term stability
- Pulsation damper can be added
- The pump is provided with 2 spare tubing.
- Required diameter should be specified by customer: 0.25 mm, 0.51 mm, 0.76 mm, 1.02 mm, 2.54 mm or 3.17 mm.

NEW!

LABORATORY ACCESSORIES





Description

BVT Custom Test Tube Stand for laboratory measurement needs.

The Stand's body is a solid structure with Interchangeable Lids. The Lids can be chosen with different Slot Sizes, for example a lid with holes of Diameter 20mm will have 40 Slots.

The amount of slots each lid has is dependent on the diameter of the holes.

Available Slot Diameters with corresponding Slot amounts:

- 11mm Diameter – 102 Slots
- 17mm Diameter – 48 Slots
- 20mm Diameter – 40 Slots
- 30mm Diameter – 18 Slots

Other Slot Diameters are available and can also be made to your required Diameters.

Physical Parameters

material PETG

Stand Parameters

Length: 245mm
Width: 105mm
Depth: 64.125mm
Height: 86.125mm

Lid Parameters

Length: 241mm
Width: 101mm
Thickness:4mm

Internal Stand Parameters

Length: 236mm
Width: 96mm
Height: 12mm

The Stand and the Internal Stand are sold together.

This offers customers the ability to use the product even with shorter vials.

Description

Single-seat magnetic stirrer without heating used to stir liquids with a stirring bar. The mixing speed can be changed continuously using the rotary control: 0-255 rpm. Lightweight and easily portable, suitable for mixing liquids with a volume of up to 1 l. The magnetic stirrer includes a connector connected to a 12 V power supply.

Physical Parameters

material PETG

Length: 159mm
Width: 137mm
Height: 60mm
Weight: 272 g

NEW!

The single-seat magnetic stirrer includes two glass magnetic stirring bars.

LABORATORY ACCESSORIES

Description
Pipette stand with a round base, designed for storing a large number of glass pipettes. Made to be robust and long-lasting, for easy organization, storage and use. The round stand contains 35 holes with a diameter of 11.38 mm and 14 holes with a diameter of 7.89 mm.

Physical Parameters
material PETG

Height: 305 mm
Diameter of the upper circular base: 150 mm
Diameter of the lower circular base: 170 mm

The lower round base of the stand can be separated from the stand for easy washing.

Description
BVT Automatic Pipette Stand, designed to hold 3 Pipettes, for ease of organization, and clearing lab clutter.

Designed to be robust and long lasting.

Physical Parameters
Length: 175mm
Width: 160mm
Height: 250mm

NEW!

Description
Petri Dish Stand. The individual stands fit together and can be stored vertically on top of each other.

The dimensions of the stand are designed for a petri dish with a diameter of 90 mm

It is possible to make the stand in other dimensions according to the size of the customer's petri dishes.

Physical Parameters
material PETG

Stand Parameters
Outer diameter: 106 mm
Inner diameter: 95 mm
Height: 27.14 mm

GLASS CELLS with stoppers

Hand made glass cells for electrochemical measurements which enable measurements with miniaturised BVT classical electrodes. The cells have a lid with NJ openings (NJ 10/8, NJ 12/10) – to fix electrodes, stirrer or connector in the cell. Stoppers are used **for prevention** of solution **evaporation, for bubbling, for dosing** by tubes or for measurements in an inert atmosphere.

Types of glass cells:

TC4 – conic openings, termostated by MT1
TC5 – conic openings, termostated by external thermostat
TC6 – conic openings, **easily washable!**
TC7 – conic opening, a **low-cost variant of the TC6 cell, ideal for students and basic lab measurements!**
TC9 - with folder for electrochemical sensor AC9

The TC7 - low cost Glass Cell

- ideal for students and basic lab measurements

The TC7 comes with a stand, specially designed for it, and the stand provides more stability and ease of use.
The Borosilicate glass cell serves for electrochemical measurements. Cell openings are designed for the SPE Electrochemical Sensors Connector KA1.C, Classical Electrodes WCEc, ACEc, RCEc, STP1.* Stoppers for Cells, and Stirrer's ST1 and ST3 separately.
The device enables the measurement with inserted samples.

NEW glass cell TC7. !

Device Usage:

- Electrochemical measurements
- Measurements with biosensors and electrochemical sensors
- Corrosion measurement

Stoppers for Cells

Stoppers are formed from white PBTP (Polybutylenterephtalate). They are used for covering of the glass cells produced by BVT.

The system with the stopper is closed and space is prevent from solution evaporation.

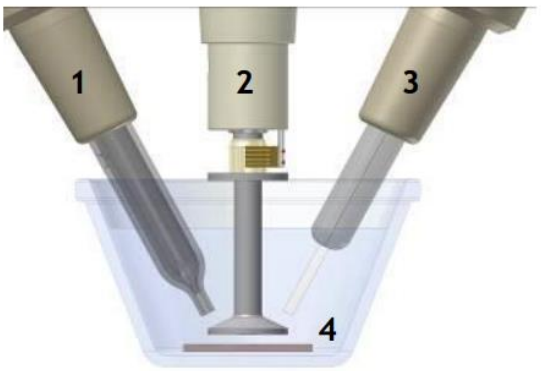
Example of application: Measurement of biochemical activity of a sample

1 - Reference electrode RCEc

2 - Mini RDE

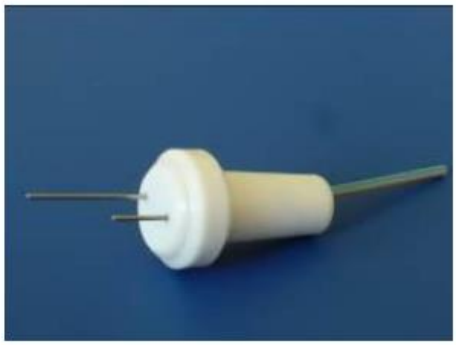
3 - Auxiliary electrode ACEc

4 - Sample with active surface



Model	Recommended Vessel	Termination
STP1.S	TC4, TC5, TC6	Stopper for TC4, TC5, TC6
STP1.1	TC4, TC5, TC6	Stopper with bubbling
STP1.2	TC4, TC5, TC6	Stopper with tubing
STP1.3	TC4, TC5, TC6	Middle stopper

STP1.1 - Stopper for bubbling

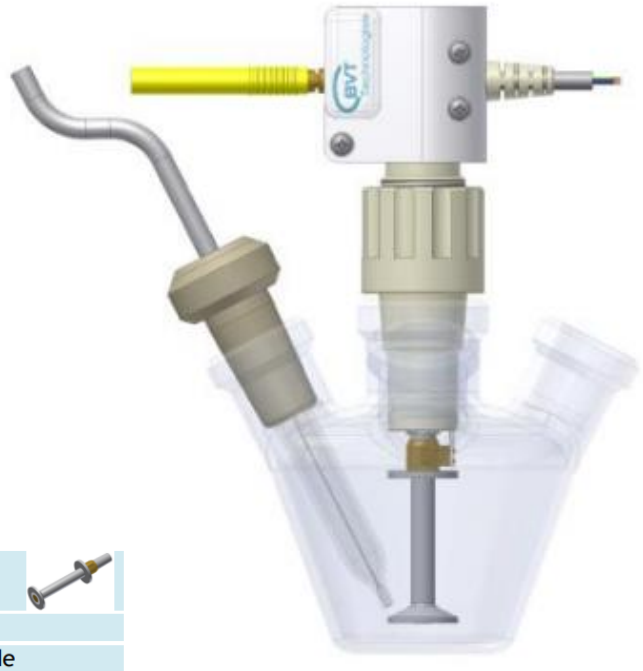


Mini rotating disc (RDE) electrode Kit

The **Rotating disk electrode in general enables defined mass transfer towards electrode surface**.

The **Mini RDE Kit** consists of **TC glass cell**, the **rotating disk electrode itself, control electronics and software**.

The device is **powered by USB connection with PC**.
Glass cell openings are suitable for connector KA1.C for electrochemical sensor AC1 or classical electrodes WCEc, ACEc and RCEc.



Mini RDE Parameters
Rotational speed: 10 - 1300 rpm

Electrode Materials are defined by **Mini 1RDE.W* and 2RDE.W***

Mini 1RDE.W*	Mini 2RDE.W*
Mini = Small size	Mini = small size
1 = Wire in glass	2 = Screen printed electrode
RDE = Rotating disc electrode	RDE = Rotating disc electrode
W = Work electrode	W = Work electrode
1 - Platinum	1 - Platinum
	2 - Gold
	3 - Cooper
	4 - Glassy carbon

Stirrers

ST1.* Universal Stirrer for screen printed and classical electrodes

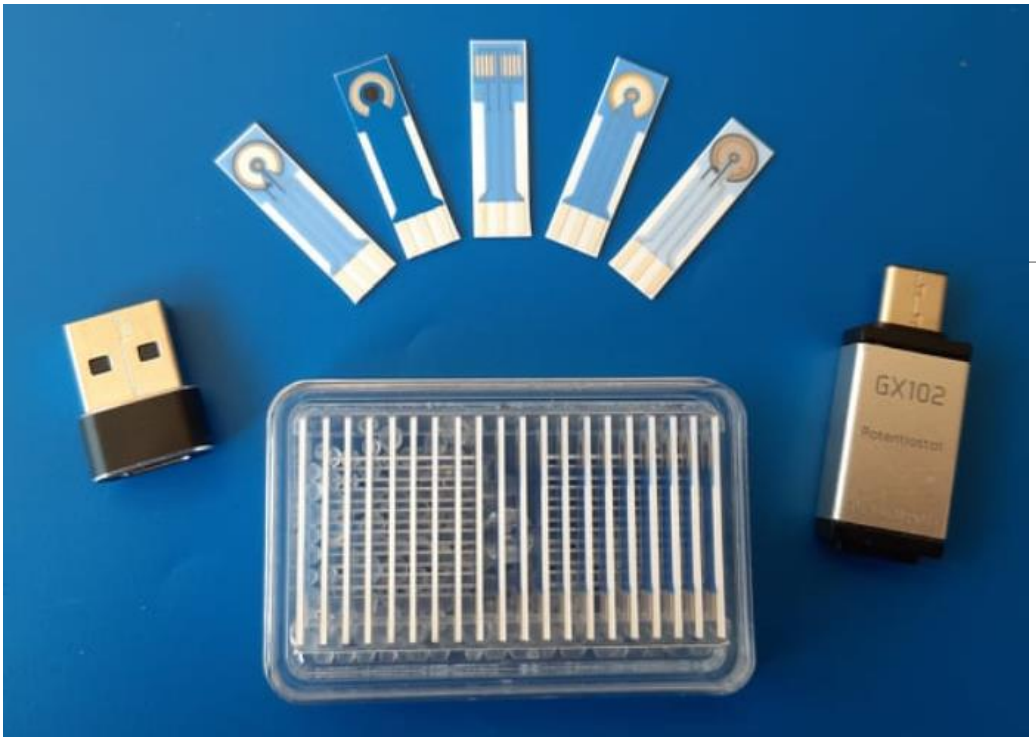
-The universal stirrer ST1 uses a common micro DC motor.
-ST1 allows the solution to be mixed and the particles to be optimally transferred to the surface of the printed or conventional electrodes.
-The construction of stirrer assures the optimum mass transport with the minimum hydrodynamic noise.
-The supply voltage 0 – 5 V and the maximum current of 450 mA mean that it can be used as a USB device.
-The stirrer is manufactured from quality materials and suitable chemical measurements.
-Revolutions range: 120 – 12 000 rpm.
-For control speed use BVT PMW control ST1.C

ST3 Universal Stirrer for screen printed and classical electrodes

-Precision Maxon motor with gearbox and encoder
-ST3 is controlled by PC software
-ST3 allows the solution to be mixed and the particles to be optimally transferred to the surface of the printed or conventional electrodes.
-The construction of stirrer assures the optimum mass transport with the minimum hydrodynamic noise
-The stirrer is manufactured from quality materials and suitable chemical measurements.
-Revolutions range: 20 - 1300 rpm (with resolution 1 rpm).

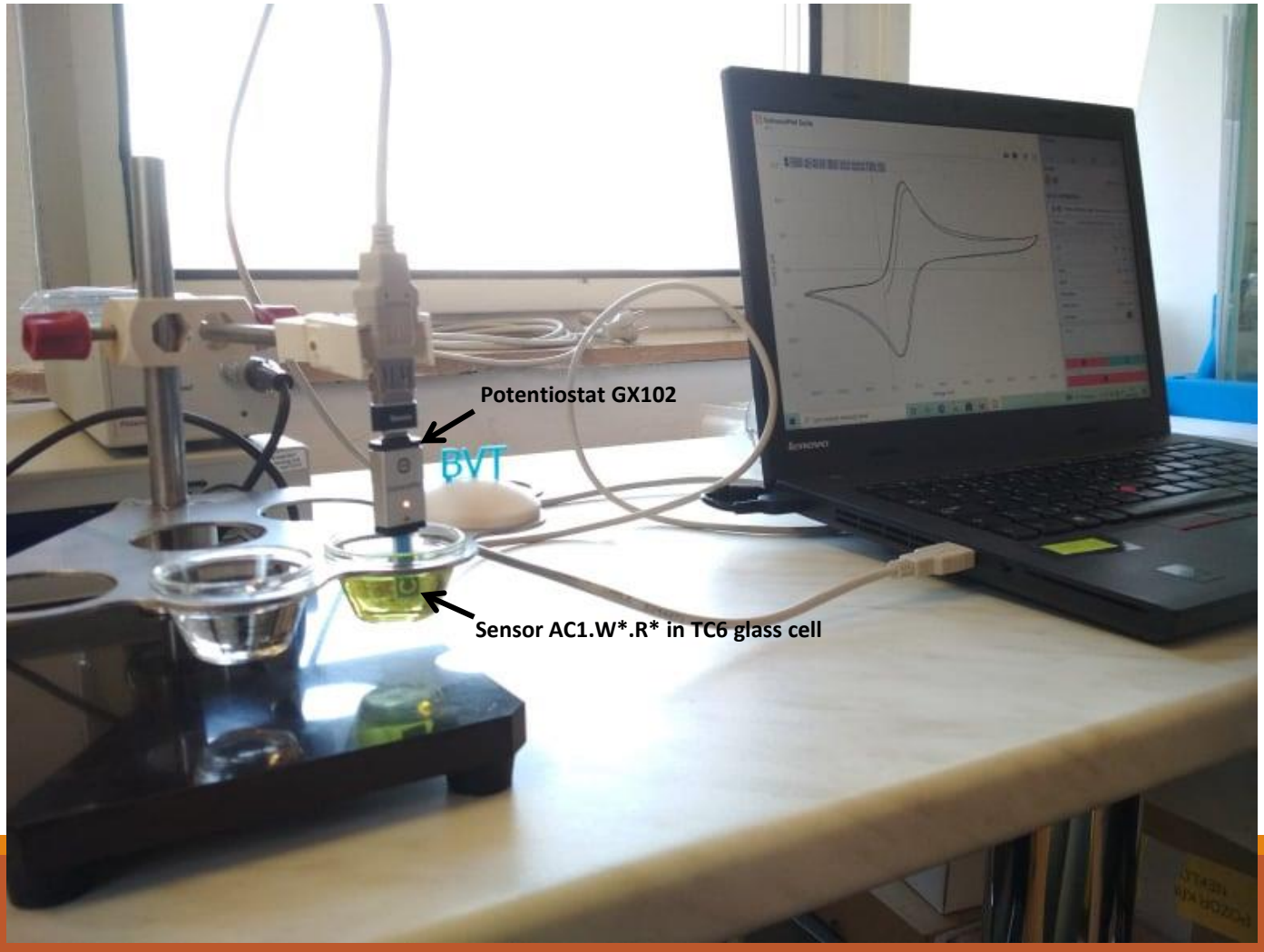
NEW!

Potentiostat GX102 and screen printed sensors BVT



solarbiotec

Example of cyclic voltammetry arrangement on a pair of potassium ferro-ferro cyanide with KOH: potentiostat GX 102 - SOLAR BIOTEC, sensors AC1.W * .R * - BVT, glass electrochemical cells TC6 with stand - BVT



DISTRIBUTION PALMSENS

PalmSens4

Description

Our flagship instrument, the PalmSens4, is a USB and battery powered Potentiostat, Galvanostat, and optional a Frequency Response Analyser (FRA) for Electrochemical Impedance Spectroscopy (EIS). The PalmSens4 has a large potential range (-5V to 5V or -10V to 10V) and current range (100 pA to 10 mA) with a high resolution and low noise.

The economical PalmSens4 is a complete laboratory instrument but its compact and rugged design makes it also ideal for field work. Connecting via Bluetooth guarantees a perfectly floating measurement.
Configurable

PalmSens4 comes in different configurations:

±5 V or ±10 V potential range
EIS/FRA with maximum frequency of 100 kHz or 1 MHz
optional Bipotentiostat module for second WE
optional iR-Compensation

On Thursday April 9, 2020, Chris Cassidy and two Russian astronauts were launched into space with a Soyuz MS-16 rocket at Site 31 at the Baikonur Cosmodrome in Kazakhstan being part of NASA expedition 63. Part of their payload: a PalmSens4 potentiostat.

Sensit Smart Smartphone potentiostat

•Capable of EIS up to 200 kHz
•Built around the EmStat Pico module
•Potential range -1.7 to +2 V
•Current ranges 100 nA – 5 mA (max ±3 mA)

The Sensit Smart is the world smallest ready-to-go potentiostat available on the market.
The Sensit Smart **can be directly inserted in a smartphone or tablet and controlled via the Android app PStouch.**
You can use the USB-C Female to USB-A cable to connect the Sensit Smart to a classic USB port on your PC and control the Sensit Smart via our PC software PSTrace.
The Sensit Smart supports most common electrochemical techniques, including Cyclic Voltammetry, Square Wave Voltammetry and Impedance Spectroscopy (FRA/EIS).

The Sensit Smart comes with:

•Dummy Cell (SPE version)
•SPE to screw-terminal adapter
•USB-C Female to USB-A cable
•USB-C Female to Micro USB adapter
•USB-C Extension cable
•USB-C port protector
•PSTrace software for Windows (activation code for my.palmsens.com)
•PStouch app for Android (find it in the Google Play Store)

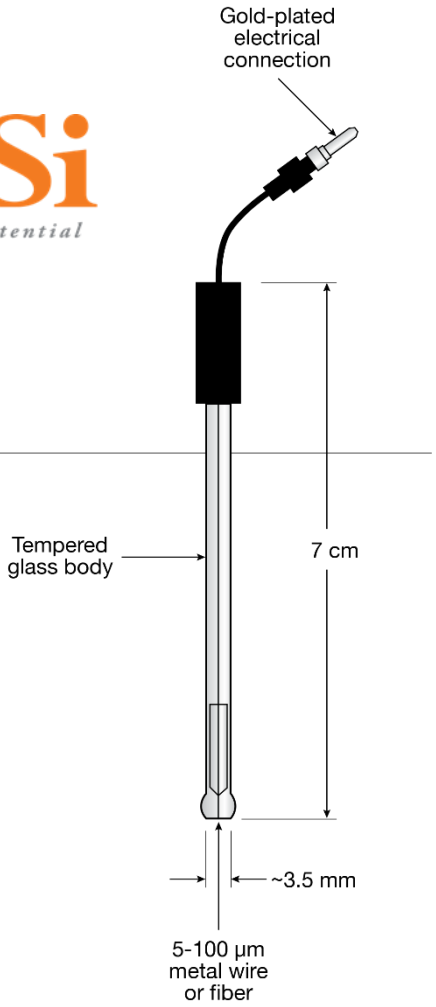
DISTRIBUTION BASI

BASi Reach Your Potential

MICROELECTRODES

Description

Microelectrodes consist of small diameter metal wires or fibers (5-100 µm) sealed within tempered glass bodies. The flattened end of the microelectrode is polished to a mirror finish, which can be maintained using the polishing materials contained in the PK-4 Polishing Kit. The electrical connection is a 0.060" gold-plated pin. Dimensions of the electrode are approximately 7 cm long and 4 mm OD. Each microelectrode is visually inspected and electrochemically tested before shipping.



Ordering Information

Platinum

Part Number	Description
MF-2005	10 µm diameter Platinum Microelectrode
MF-2151	25 µm diameter Platinum Microelectrode
MF-2152	50 µm diameter Platinum Microelectrode
MF-2150	100 µm diameter Platinum Microelectrode

Gold

Part Number	Description
MF-2006	10 µm diameter Gold Microelectrode
MF-2153	25 µm diameter Gold Microelectrode
MF-2154	50 µm diameter Gold Microelectrode
MF-2155	100 µm diameter Gold Microelectrode

Carbon Fiber

Part Number	Description
MF-2007	11 µm (±2 µm) diameter Carbon Fiber Microelectrode

Custom fabrication is available, e.g. 25 µm silver, 25 µm gold, etc. Please Contact BASi to discuss your requirements

ELECTROCHEMICAL CELLS

Photo-Electrochemical Cell Kit

Corrosion Cells

MINISTERSTVO
PRŮMYSLU A OBCHODU

RUNNING BVT PROJECT

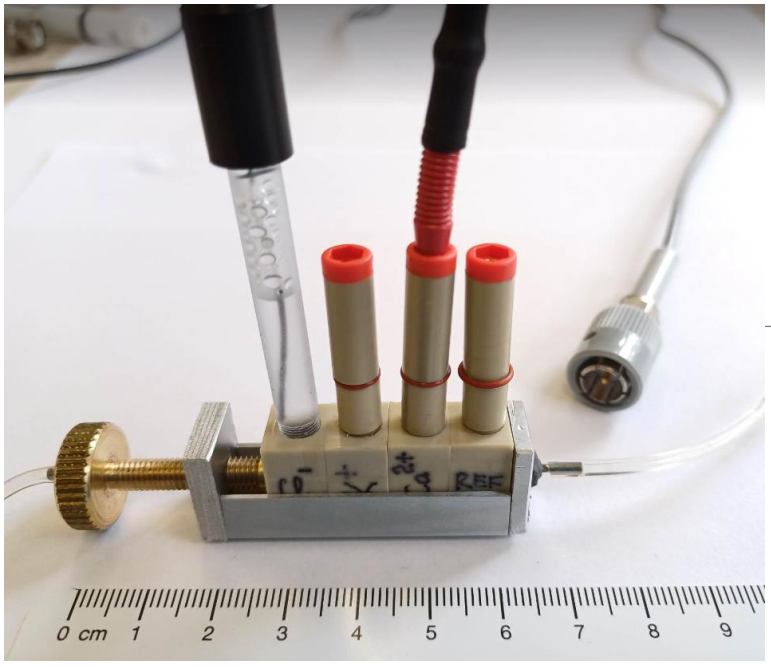
BVT Technologies was granted projects for:

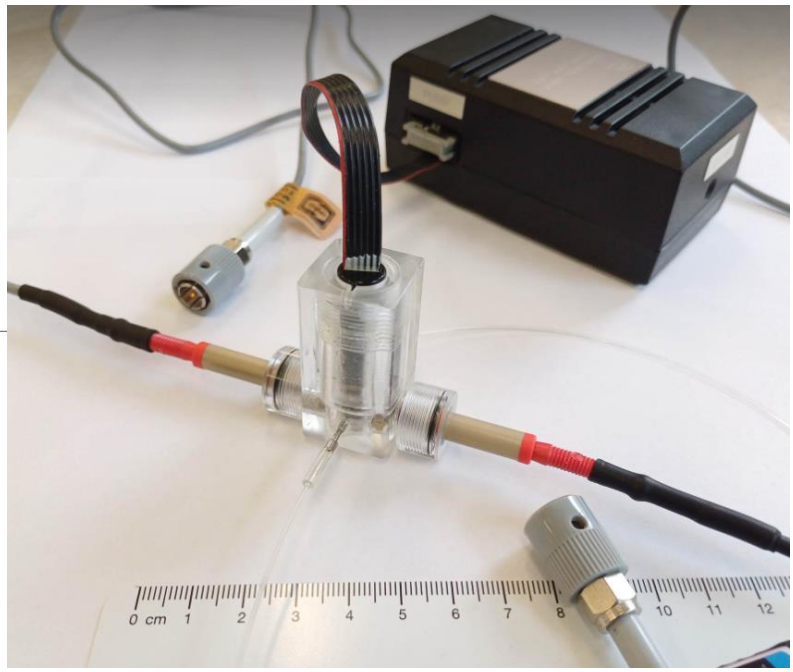
New generation of ISE electrodes : CZ.01.1.02/0.0/0.0/21_374/0027289

The aim of the project is to introduce new ion-selective electrodes suitable for continuous measurement.
The result of the project will be

- ISE prototypes with a diameter of 6 mm for the determination of Cl, Na, K, Ca ions
- Prototypes of flow chambers for 3 analytes and reference electrode and flow chambers for 1 analyte and reference electrode with integrated stirrer
- Report analyzing the possibility of further miniaturization of ISE electrodes (< 3 mm) and verification of the possibility of determining other analytes - new ionophores.

The resulting prototypes of flow cells with miniaturized ISE electrodes with a diameter of 6 mm see the Photo below.





Results from the study of stability, temperature dependence and reproducibility of the response of ion-selective electrodes were presented by BVT at **the 42nd conference of modern electrochemical methods in Jetřichovice.**

•PDF from 42nd Modern Electrochemical Methods 2023
http://bvt.cz/wpcontent/uploads/2023/06/Sbornik_metody23_42ndModernElectrochemicalMethods.pdf

CUSTOMER´S PROJECTS SUPPORT

TRAINING – usage of sensors, training of work with our instruments and apparatus

- ✓ **Glucose sensors, their use and measurement**
- ✓ **AChE sensors, their use and measurement**
- ✓ **Activity of enzymes measurement**
- ✓ **Inhibition of enzymes measurement**
- ✓ **Detection of organophosphorus and carbamate pesticides**
- ✓ **Biosensors based on interaction between algae and analyte**
- ✓ **Detection of herbicides**
- ✓ **Measurement of bioavailable toxic compounds**
- ✓ **The application of biosensor on demand of customer (If necessary the cost of preparation and special sensors or chemicals is added to the standard price.)**

PROJECT Support Consultancy

BVT has a lot of experience from participating in International Projects and developments of technology such as Sensors/Electrodes and Lab Equipment, which allows us the ability to provide support and consultancy services for multiple types of projects and also as a 3rd party expert for help or consultancy on projects. With our 30+ Years of experience in a range of areas, we can provide expert and reliable advice.
We have experts in the field of Chemistry, Biochemistry, Thick Film Technology and Engineering and Design, who are on hand with their knowledge to assist partners and customers alike.
Some examples of Projects that we have worked on include HydroSense (No. 7D19007), InFuLOC (No. 230749) and BioMedNano (No. 017350), these projects show a range of what BVT has to offer in other projects and as consultants.

ORGANIZATION of workshops, project meetings

The training activities can be connected with workshop or summer school with interesting social program.

NEW ARTICLE

Review | Published: 14 January 2022

Microdialysis techniques and microdialysis-based patient-near diagnostics

Mark Thomas O'Connell & Jan Krejci

Analytical and Bioanalytical Chemistry **414**, 3165–3175 (2022) | Cite this article

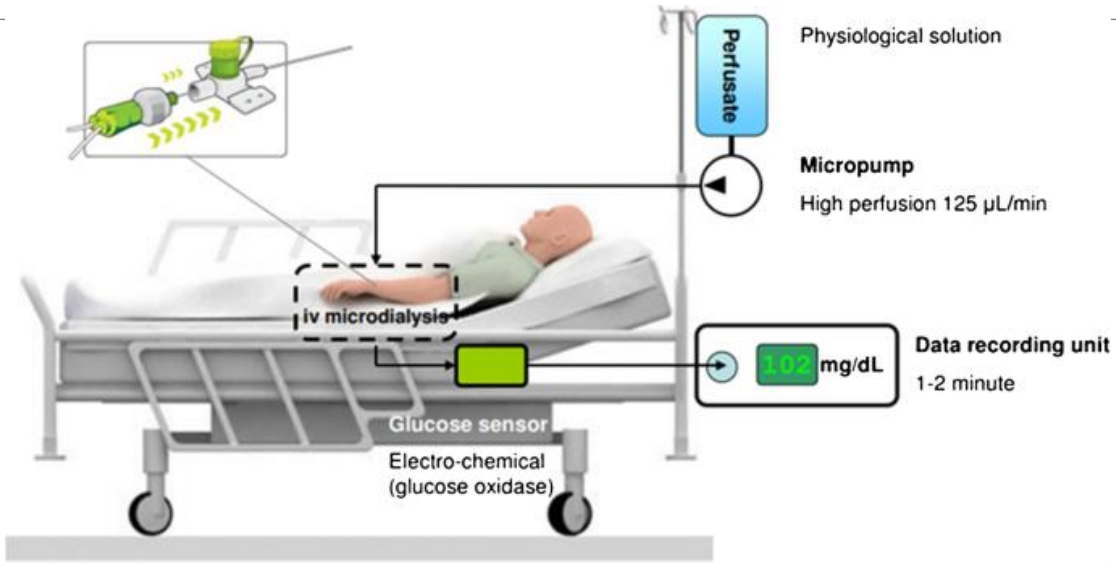
206 Accesses | **1** Citations | **2** Altmetric | Metrics

Abstract

This article will debate the usefulness of POCT measurements and the contribution microdialysis can make to generating valuable information. A particular theme will be the rarely considered difference between ex vivo sampling, which typically generates only a static measure of concentration, and in vivo measurements that are subject to dynamic changes due to mass transfer. Those dynamic changes provide information about the patients' physiological state.

O'CONNELL, Mark Thomas a Jan KREJCI. Microdialysis techniques and microdialysis-based patient-near diagnostics. *Analytical and Bioanalytical Chemistry* [online]. 2022, **414**(10), 3165-3175. ISSN 1618-2642. Dostupné z: doi:10.1007/s00216-021-03830-6

https://link.springer.com/article/10.1007/s00216-021-03830-6



NEW BVT ARTICLE

Perspective—Thick Film Technology

Radka Kucerova[1], Lucie Jezova[1], Stepanka Bendova[1], Anna Belusova[1], Yuvraj Bhardwaj[1] and Jan Krejci[1]

Published 28 February 2022 • © 2022 The Electrochemical Society ("ECS"). Published on behalf of ECS by IOP Publishing Limited

Journal of The Electrochemical Society, Volume 169, Number 2

Focus Issue on Women in Electrochemistry

Citation Radka Kucerova *et al* 2022 *J. Electrochem. Soc.* **169** 027519

Abstract

Thick Film Technology (TFT) offers a new platform for analytical procedures in Electrochemistry. The most routine technology is screen printing. However, it can introduce new procedures connected with miniaturisation or combination of microfluidic and electrodes. TFT use in electrochemistry is discussed. Examples of different sensors are demonstrated. Details are referred to in the original literature. Advanced applications combining TFT with other technologies are demonstrated (capillary electrophoresis on a chip and a sensor with integrated heating and thermometer). Future of TFT in electrochemistry is discussed, also the drawbacks, connection to production and commercial application are noticed.

KUCEROVA, Radka, Lucie JEZOVA, Stepanka BENDOVA, Anna BELUSOVA, Yuvraj BHARDWAJ a Jan KREJCI. Perspective—Thick Film Technology. *Journal of The Electrochemical Society* [online]. 2022, **169**(2). ISSN 0013-4651. Dostupné z: doi:10.1149/1945-7111/ac5546

https://www.researchgate.net/publication/358630407_Perspective-Thick_Film_Technology