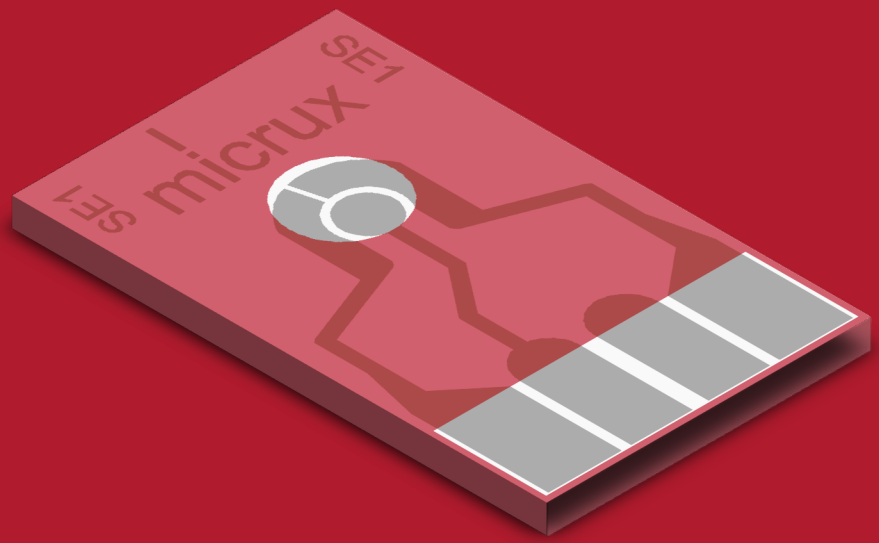
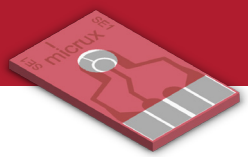
micrux
TECHNOLOGIES



Thin-film single-electrodes

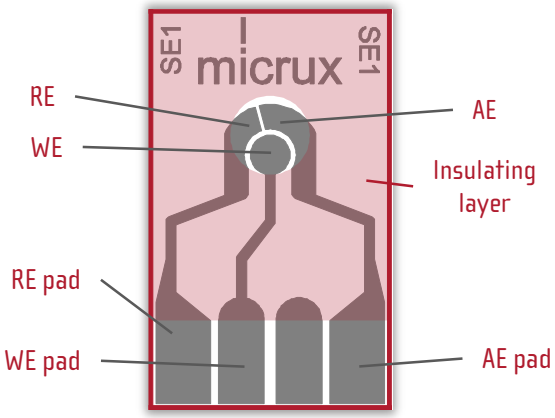
Thin-film single-electrodes



Metal-based electrodes are fabricated by thin-film technologies on a Glass substrate. A SU-8 resin protective layer is used to delimit the electrochemical cell enabling the use of very small sample volume.

» Thin-film based-electrode features

Thin-film technologies enable the manufacture of electrodes with high precision and resolution.



» Standard dimensions:	10 x 6 x 0.7 mm
» Substrate:	Glass
» Protective layer:	SU8/PI resin
» Electrochemical cell:	2 mm Ø
» Sample volume:	1 – 5 µL
» Electrode material:	Platinum or Gold

» Thin-film electrode packs

Thin-film SE electrodes are supplied in 50 units packs. They should be stored at room temperature in a dry place.

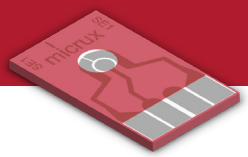
» Applications

The inherent properties of the thin-film electrodes such as low cost & disposables, reusable, high fabrication resolution, high sensitivity, low reagent consumption as well as non-tedious pre-cleaning procedures provide a suitable tool for multiple applications.

Electroanalysis	Flow Systems & microfluidics	Nanotechnology	Biosensors
✓ Study EC reactions	✓ FIA Systems	✓ Modified electrodes	✓ EC transducers
✓ Trace EC analysis	✓ Microchips Electrophoresis	✓ New nanostructures	✓ New recognition elements
✓ In-vivo measurements	✓ Capillary Electrophoresis	✓ New nanomaterials	✓ POC systems
	✓ HPLC		

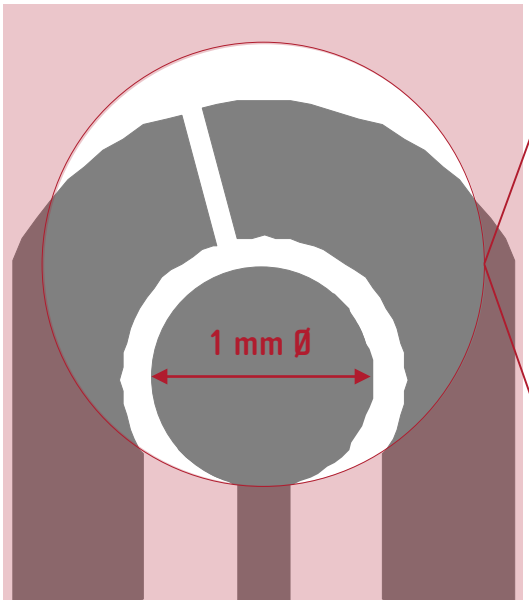
© 2025 MicruX Technologies

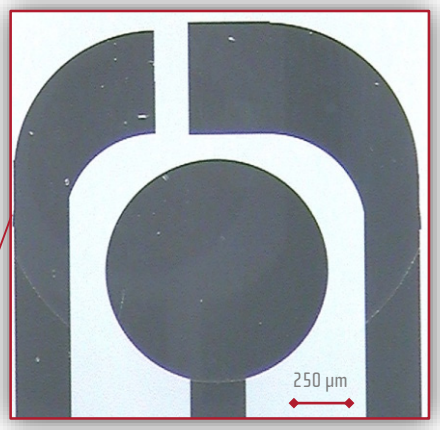
Thin-film single-electrodes



» Electrochemical cell

Platinum (*Ref. ED-SE1-Pt*) & Gold (*Ref. ED-SE1-Au*) thin-film electrochemical sensors are based on a three-electrodes (working – WE, reference – RE and auxiliary – AE) approach.

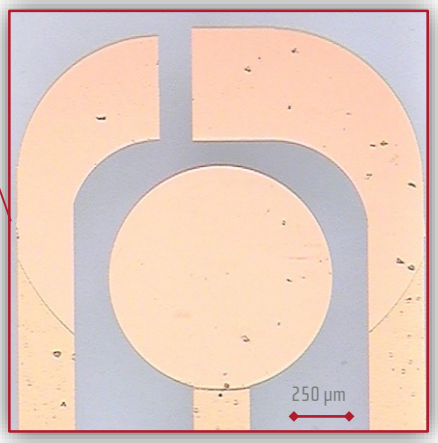




» *Ref. ED-SE1-Pt*

WE: 50/150 nm Ti/Pt (*1 mm Ø*)

RE – AE: 50/150 nm Ti/Pt



» *Ref. ED-SE1-Au*

WE: 50/150 nm Ti/Au (1 mm Ø)

RE – AE: 50/150 nm Ti/Au

Metal-based electrodes require an (electro)chemical surface pre-cleaning before using them in order to get the best performance.

BASIC PRE-CLEANING PROTOCOL

Cyclic voltammetry in the BGE (H_2SO_4, HCl, KCl...) between -1.5 and +1.5 V (at least 10 cycles) for Pt-based electrodes or -1,0 and +1,3 V (at least 12 cycles) for Au-based electrodes; sweep rate 0.1 V/s.

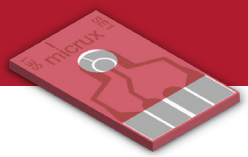
CAUTION

Gold-based thin-film electrodes may not be used with chloride-based solutions. Gold is peeled off from the electrode surface with chlorides when it is used in a potential window out of the range -0.3 – 0.6 V.*

**Solution pH may modify this potential range.*

© 2025 MicruX Technologies

Thin-film single-electrodes

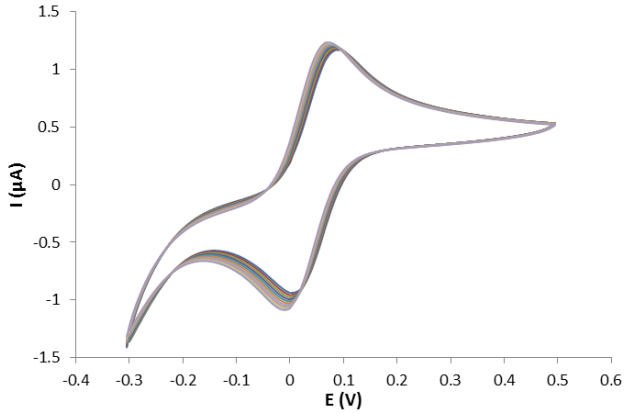


» Thin-film electrode performance

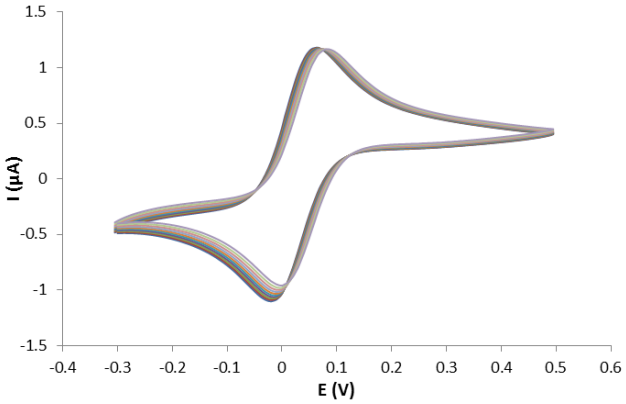
» Platinum Thin-Film Electrode

» Gold Thin-Film Electrode

» Precision intra-electrode

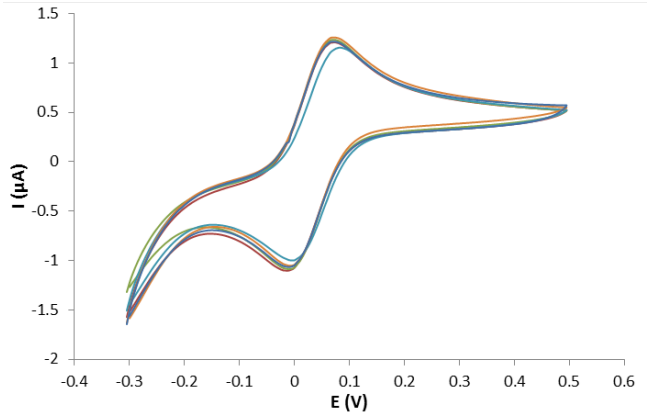


*Successive cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M KCl at the **same** thin-film Pt electrode (**ED-SE1-Pt**). v = 50 mV/s, n = 10, **RSD = 4%***

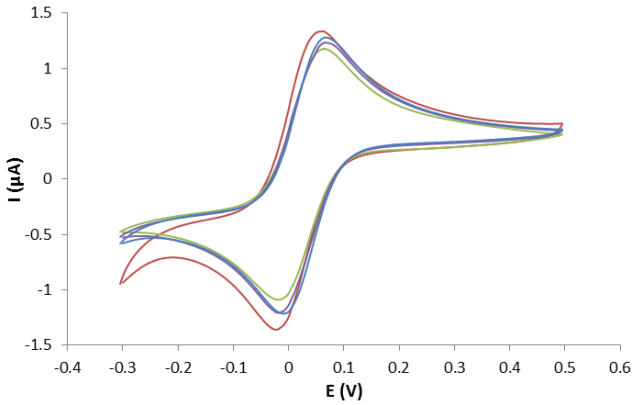


*Successive cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.1 M H_2SO_4 at the **same** thin-film Au electrode (**ED-SE1-Au**). v = 50 mV/s, n = 10, **RSD = 3%***

» Precision inter-electrode

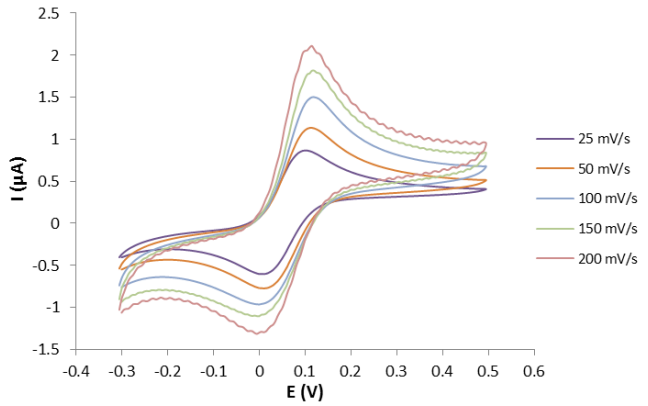


*Cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M KCl at **different** thin-film Pt electrodes (**ED-SE1-Pt**). v = 50 mV/s, n = 5, **RSD = 4%***

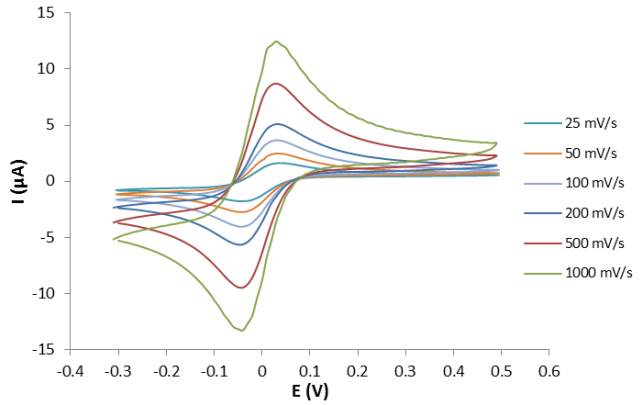


*Cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.1 M H_2SO_4 at **different** thin-film Au electrodes (**ED-SE1-Au**). v = 50 mV/s, n = 4, **RSD = 6%***

» Sweep rate



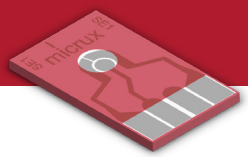
*Cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M KCl using different **scan rates** at a thin-film Pt electrode.*



*Cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.1 M H_2SO_4 using different **scan rates** at a thin-film Au electrode.*

© 2025 MicruX Technologies

Thin-film single-electrodes



» Thin-film electrodes related accessories

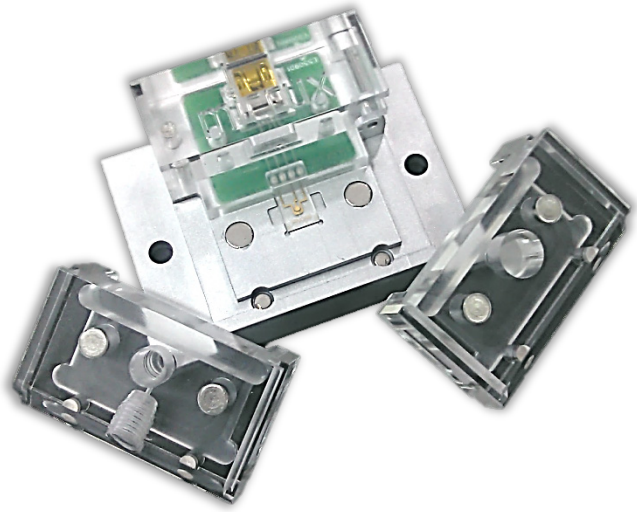
» Drop-cell connector

The drop-cell connector *(Ref. ED-DROP-CELL)* provides a true user-friendly and robust (long life-time) interface with the potentiostat, enabling the use of microvolume (1 – 10 µL sample drops) with all standard (10 x 6 mm) thin-film (micro)electrodes.

» All-in-One Platform

The innovative All-in-One cell *(Ref. ED-AIO-CELL)* provides an unique multipurpose interface with movable add-ons that can be easily interchanged for using the standard (10 x 6 mm) thin-film (micro)electrodes.

The AIO-cell enables the use of the thin-film (micro)electrodes in static (*Drop / Batch-cell*) or dynamic (*Flow-cell*) conditions, fulfilling the requirements of multiple electroanalytical applications.



» All-in-One Platform Add-ons

Different standard **methacrylate** (PMMA) Flow-cell and Batch-cell add-ons are available for using in combination with the AIO platform. Transparent **PMMA** is a suitable material for most of the analytical applications.

Flow-cell and Batch-cell add-ons are also available in **PEEK** (polyether ether ketone) on demand. **PEEK** offers advantages for applications where high mechanical and chemical resistance is required.

The drop-cell connector and AIO platform are supplied with an universal cable compatible with any commercial potentiostat

© 2025 MicruX Technologies

micrux
TECHNOLOGIES

Mora-Garay Industrial Park · Juan de la Cierva, 2C, Bldg. # 6
33211 · Gijón (Asturias) · SPAIN

Phone/FAX: +34 984151019

E-mail: info@micruxfluidic.com
Web: www.micruxfluidic.com

Smart Microfluidic and Electrochemical Solutions for Research Science