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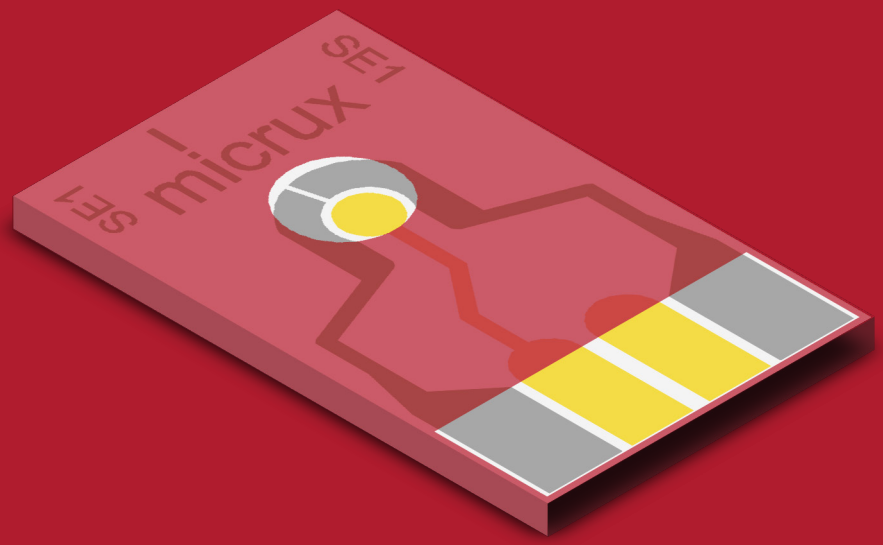


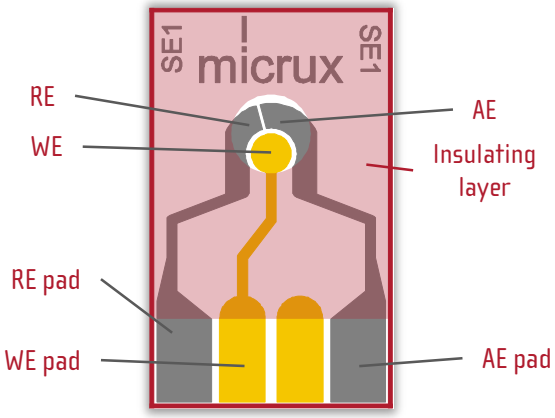
Thin-film double metal single-electrodes

Thin-film double metal single-electrodes

Double 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 in two different materials combined on the same electrochemical cell 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:	Gold (WE) Platinum (RE – AE)

» Thin-film electrode packs

Thin-film SE electrodes are supplied in 25 units packs. They should be stored at room temperature in a dry place.

» Applications

The combination of two different metal electrodes in the same EC cell enables the modification of the working electrode surface selectively without affecting the surface of the reference and auxiliary electrodes. Moreover, the inherent properties related to the thin-film electrodes provide a suitable tool for other 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		

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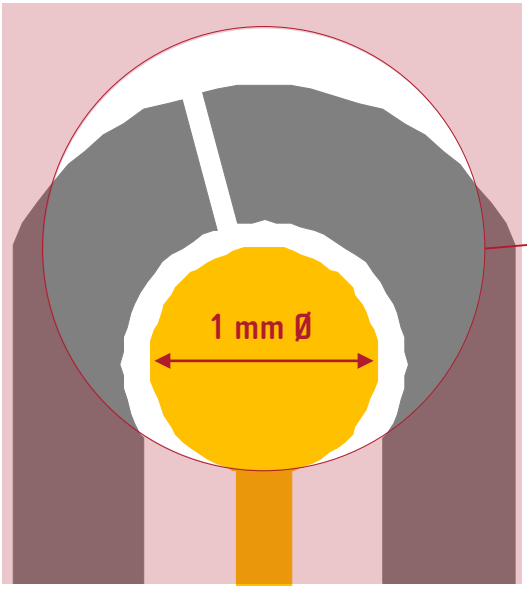
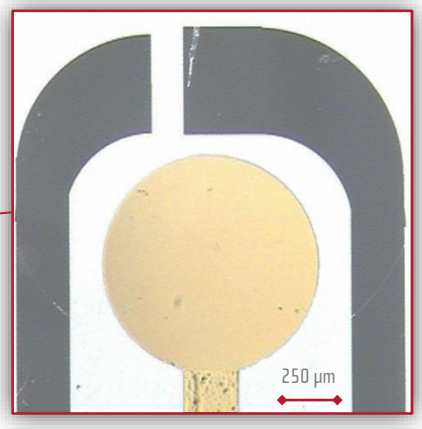
Thin-film double metal single-electrodes

» Electrochemical cell

Gold/Platinum *(Ref. ED-SE1-AuPt)* thin-film electrochemical sensors are based on a three-electrodes approach with a *gold* working electrode (WE) and *platinum* reference (RE) & auxiliary (AE) electrodes.





» *Ref. ED-SE1-AuPt*

WE: 50/150 nm Ti/Au (*1 mm Ø*)

RE – AE: 50/150 nm Ti/Pt

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

BASIC PRE-CLEANING PROTOCOL

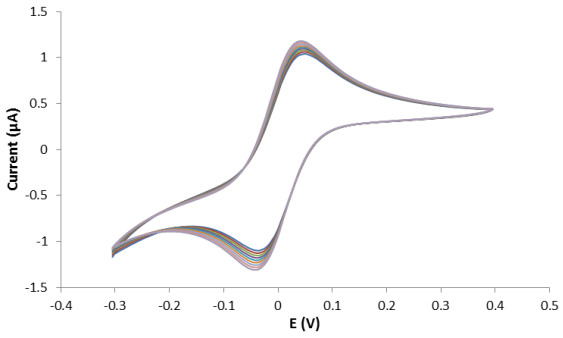
Cyclic voltammetry in a chloride-free BGE (e.g. H_2SO_4 0.05 – 0.1 M) between -1.5 and +1.5 V (at least 10 cycles); sweep rate 0.1 V/s.

CAUTION

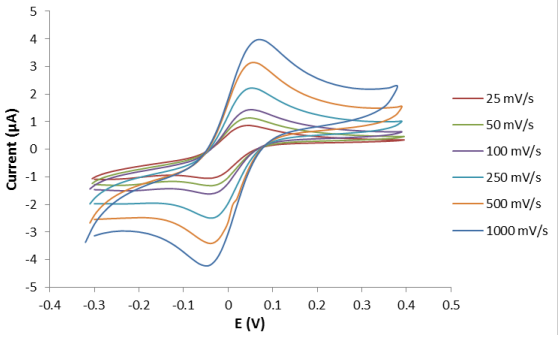
Gold-based thin-film electrodes may not be used with chloride-based solutions. Gold is peeled off from the electrode surface with chlorides when it is used in a potential window out of the range -0.3 – 0.6 V.*

**Solution pH may modify this potential range.*

» Thin-film electrode performance



Successive cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M KCl at the same thin-film Au electrode (ED-SE1-AuPt). v = 50 mV/s, n = 10, RSD = 3%



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

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Thin-film double metal single-electrodes

» Thin-film electrodes related accessories

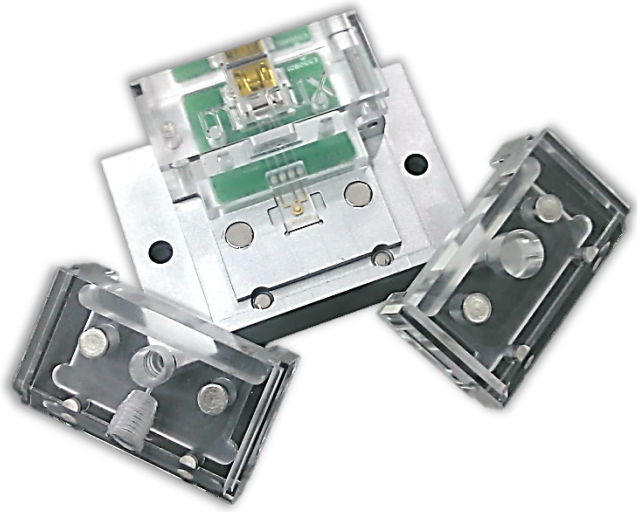
» Drop-cell connector

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

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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

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