

Thin-film Microelectrode Arrays

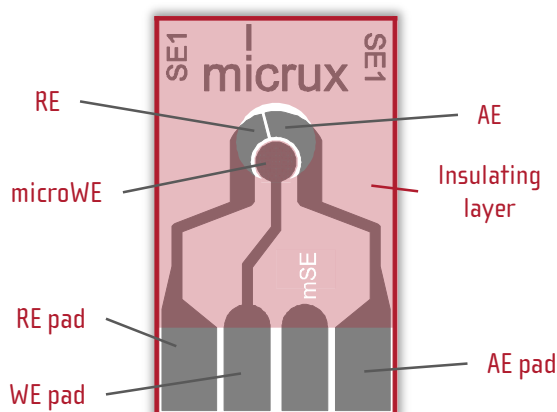
Thin-film Microelectrode arrays



Metal-based **microelectrodes** are fabricated by **thin-film technologies** on a Glass substrate. **Microelectrode arrays (MEA)** based on **pinholes** with a honeycomb microstructure can be manufactured on a working single-electrode.

» Thin-film based-electrode features

Thin-film technologies enable the development of **small microstructures** (<25 µm) with high resolution and precision.



- » **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

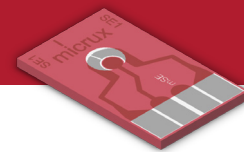
Thin-film mSE electrodes are supplied in **50 units packs**. They should be stored at room temperature in a dry place.

» Applications

Thin-film microelectrode arrays are a useful tool for **enhancing** the analytical parameters in **multiple applications** taking advantages of their inherent properties such as low cost & disposables, reusable, high fabrication resolution, high sensitivity, low reagent consumption as well as non-tedious pre-cleaning procedures.

Electroanalysis	Flow Systems & microfluidics	Nanotechnology	Biosensors
<ul style="list-style-type: none"> ✓ Study EC reactions ✓ Trace EC analysis ✓ In-vivo measurements 	<ul style="list-style-type: none"> ✓ FIA Systems ✓ Microchips Electrophoresis ✓ Capillary Electrophoresis ✓ HPLC 	<ul style="list-style-type: none"> ✓ Modified electrodes ✓ New nanostructures ✓ New nanomaterials 	<ul style="list-style-type: none"> ✓ EC transducers ✓ New recognition elements ✓ POC systems

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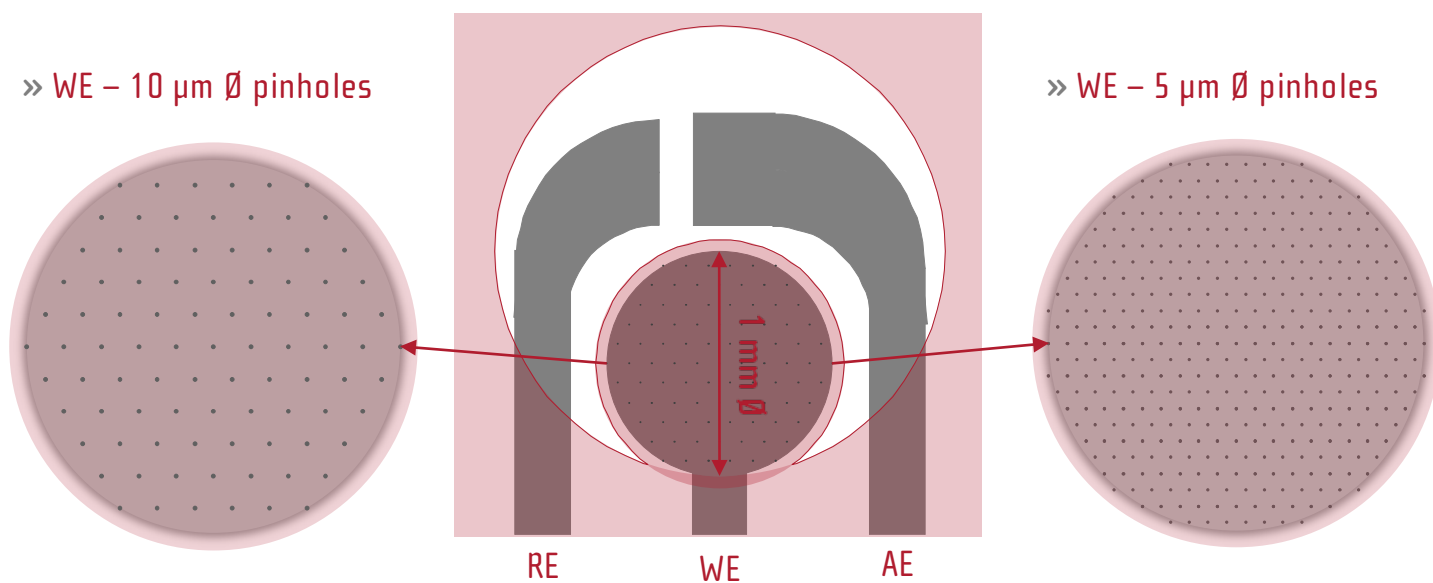


» Electrochemical cell

The electrochemical mSE sensor is based on a three-electrodes (working – WE, reference – RE and auxiliary – AE) approach. The working electrode (1 mm diameter) consists of a metal surface (platinum or gold) coated with SU-8 resin in which is defined different microholes array with a honeycomb structure.

» WE – 10 μm Ø pinholes

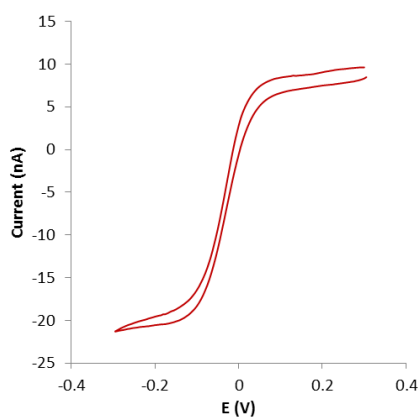
» WE – 5 μm Ø pinholes



Reference	Electrode Material	Working Electrode Microstructure			Electrode Thickness
		μHoles diameter	μHoles pitch	μHoles number	
» ED-mSE-5-Pt	Ti/Pt	5 μm	50 μm	500	50/150 nm
» ED-mSE-10-Pt	Ti/Pt	10 μm	100 μm	90	50/150 nm
» ED-mSE-5-Au	Ti/Au	5 μm	50 μm	500	50/150 nm
» ED-mSE-10-Au	Ti/Au	10 μm	100 μm	90	50/150 nm

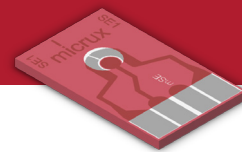
» Thin-film microelectrode performance

Thin-film MEA electrodes show the typical microelectrode behavior to enhance the analytical signals by reaching the steady-state in a short time.



Cyclic voltammogram for 1 mM ferrocene methylalcohol in 0.1 M H₂SO₄ at a thin-film gold microelectrode array (ED-mSE-10-Au). $v = 10$ mV/s.

Electrode pre-cleaning by cyclic voltammetry between -1.5V and +1.5 V ($n = 10$, $v = 100$ mV/s) – BGE: 0.1 M H₂SO₄.



» Thin-film electrodes related accessories



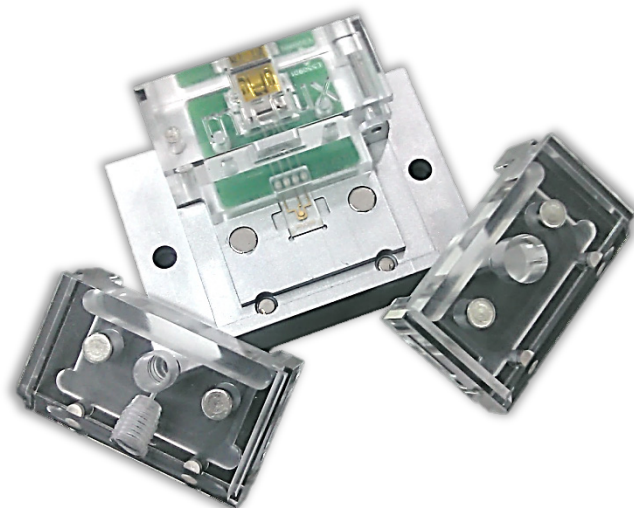
» Drop-cell connector

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 μ L 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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