

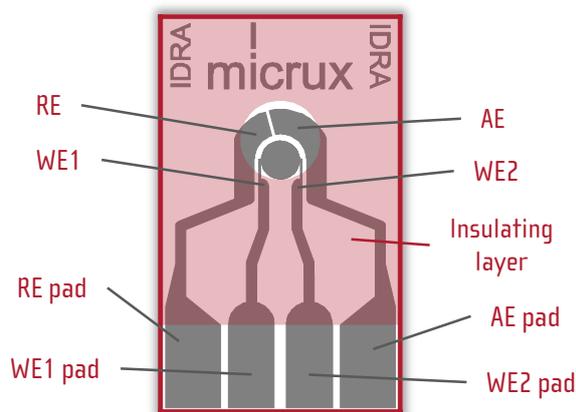
Thin-film Interdigitated ring array



Metal-based **microelectrodes** are fabricated by **thin-film technologies** on a Glass substrate. **Interdigitated ring array (IDRA)** electrodes bring a radial design specially focused on **flow analysis systems**.

» Thin-film based-electrode features

Thin-film technologies open the gate to develop special **microelectrodes** designs.



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

» Applications

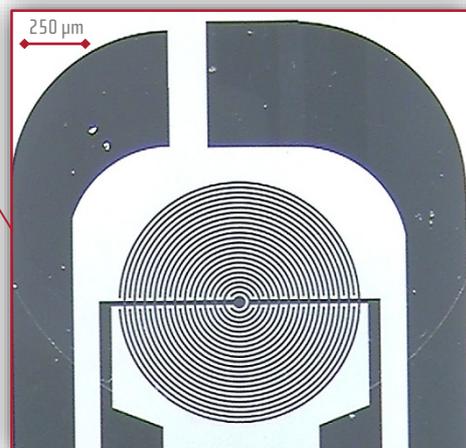
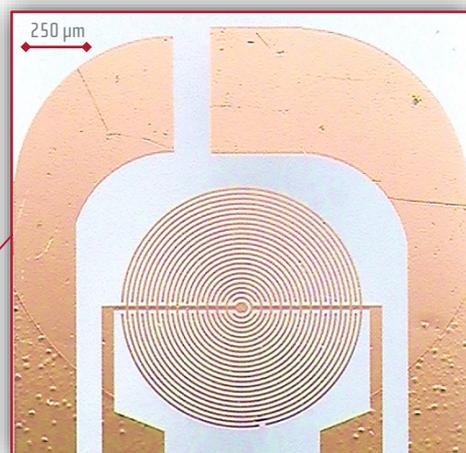
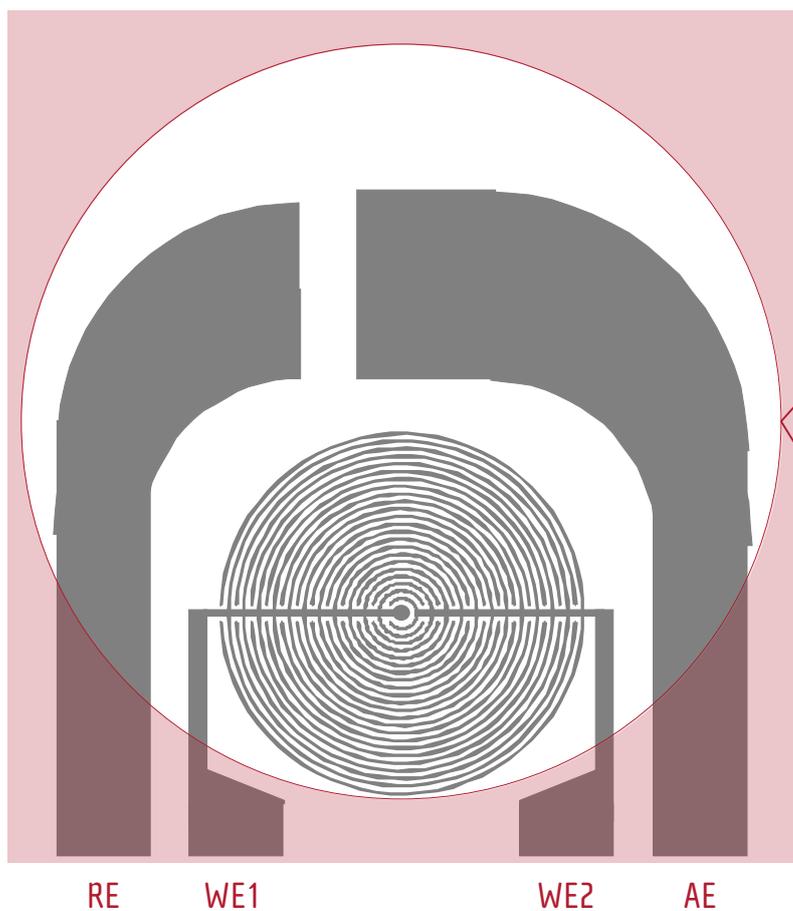
Thin-film microelectrodes are a useful tool for **enhancing** the analytical parameters in **multiple applications** taking advantages of their inherent properties such as low cost & disposables, reusable, high fabrication resolution, high sensitivity, low reagent consumption as well as non-tedious pre-cleaning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

Electroanalysis	Flow Systems & microfluidics	Nanotechnology	Biosensors
<ul style="list-style-type: none"> ✓ Study EC reactions ✓ Trace EC analysis ✓ In-vivo measurements ✓ Redox cycling 	<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



» Electrochemical cell

Platinum & Gold thin-film interdigitated ring array (IDRA) electrodes are based on a four-electrodes (working – WE1/WE2, reference – RE and auxiliary – AE) system. The **working electrode** consists of **two** individually addressable radial arrays of microelectrodes with an **interdigitated** approach.



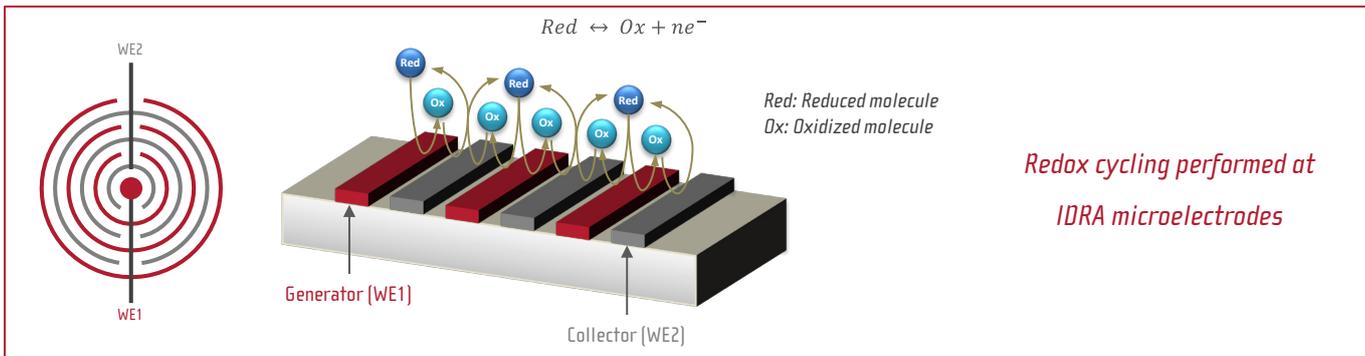
» IDRA working electrode

Reference	Material	μElectrode width	μElectrode gap	Number of feet	Thickness
» ED-IDRA1-Pt	Ti/Pt	10 μm	10 μm	12 pairs	50/150 nm
» ED-IDRA1-Au	Ti/Au	10 μm	10 μm	12 pairs	50/150 nm

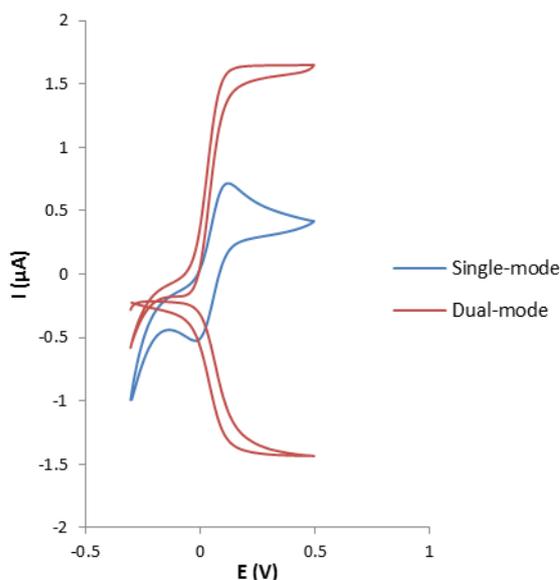


» Thin-film electrode performance

Thin-film IDRA1 electrodes could be used in **single-mode** (only one WE, *generator*, is connected) or **dual-mode** (both WEs, *generator* and *collector*, are connected).



» Platinum Thin-Film IDRA Electrode



Cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ using **single-** and **dual-mode** at a Platinum IDRA electrode.

Conditions: BGE: 0.1 M KCl.
Generator (WE1) potential cycled from -0.3 to 0.5 V at 50 mV/s.
Collector (WE2) potential held constant at -0.3 V (dual-mode).

Redox Cycling (R_f): 2.5 ± 0.5
Collection Efficiency: $(70 \pm 5)\%$

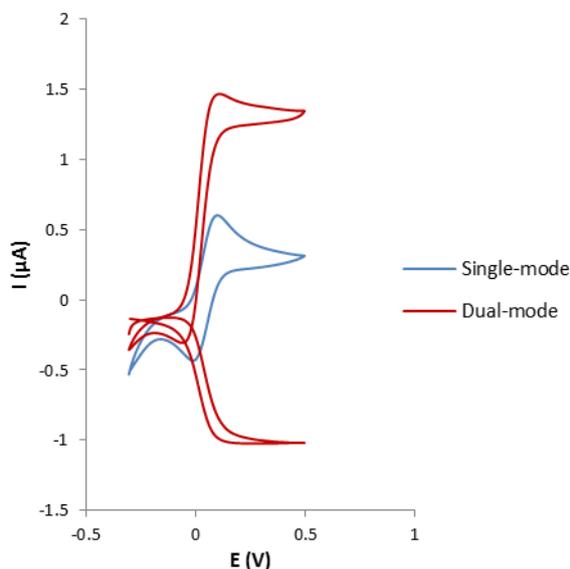
Dual-mode enables the **microelectrode behavior**, reaching the **steady-state** in a short time and **enhancing** the analytical signals.

» Gold Thin-Film IDRA Electrode

Cyclic voltammograms for 1 mM ferrocene methylalcohol using **single-** and **dual-mode** at a Gold IDRA electrode.

Conditions: BGE: 0.1 M H_2SO_4 .
Generator (WE1) potential cycled from -0.3 to 0.5 V at 50 mV/s.
Collector (WE2) potential held constant at -0.3 V (dual-mode).

Redox Cycling (R_f): 2.5 ± 0.5
Collection Efficiency: $(60 \pm 5)\%$





» 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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