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 0.75 mm
- **Substrate:** Glass
- **Protective layer:** SU-8 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.
> 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 (H₂SO₄, HCl, KCl…) 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 single-electrodes

» Thin-film electrode performance

» Platinum Thin-Film Electrode

Successive cyclic voltammograms for 1 mM K₄Fe(CN)₆ in 0.1 M KCl at the same thin-film Pt electrode (ED-SE1-Pt).

ν = 50 mV/s, n = 10, RSD = 4%

Cyclic voltammograms for 1 mM K₄Fe(CN)₆ in 0.1 M KCl at different thin-film Pt electrodes (ED-SE1-Pt).

ν = 50 mV/s, n = 5, RSD = 4%

Cyclic voltammograms for 1 mM K₄Fe(CN)₆ in 0.1 M KCl using different scan rates at a thin-film Pt electrode.

» Gold Thin-Film Electrode

Successive cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.05 M H₂SO₄ at the same thin-film Au electrode (ED-SE1-Au).

ν = 50 mV/s, n = 10, RSD = 3%

Cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.05 M H₂SO₄ at different thin-film Au electrodes (ED-SE1-Au).

ν = 50 mV/s, n = 4, RSD = 6%

Cyclic voltammograms for 1 mM ferrocene methylalcohol in 0.05 M H₂SO₄ using different scan rates at a thin-film Au electrode.
» 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.

© 2017 MicruX Technologies