

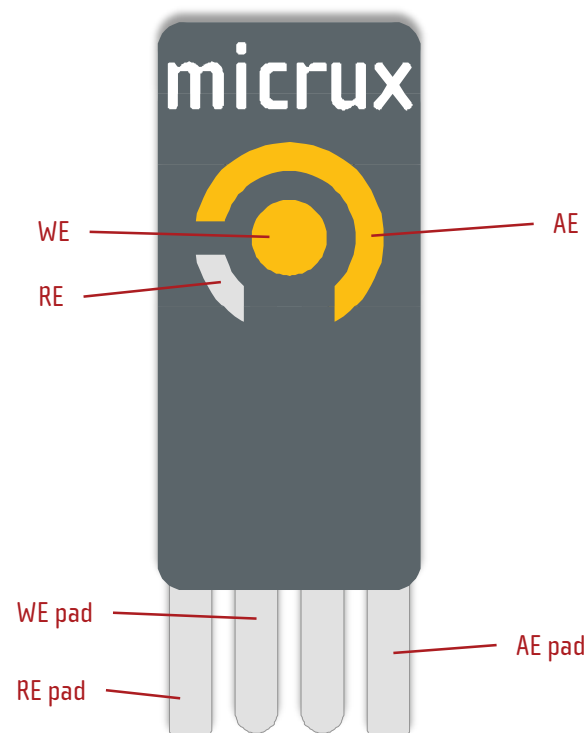


# Thick-film Gold Single-Electrodes



Thick-film gold electrodes (ED-51PE-Au) are fabricated by **printing technologies** on a flexible and high-resist PET or a rigid **ceramic** substrate. These low-cost and disposable electrochemical sensors enable the use of **small sample volume**.

## » Thick-film based-electrode features



Printing technologies enable the manufacture of planar electrodes suitable for working with sample microdrop.

» Standard dimensions:	27.5 x 10.1 mm
» Substrate:	PET (white) / Ceramic ( $\text{Al}_2\text{O}_3$ )
» Substrate thickness:	350 $\mu\text{m}$ / 380 $\mu\text{m}$
» WE dimensions:	3 mm $\varnothing$ (7,1 $\text{mm}^2$ )
» Sample volume:	20 – 50 $\mu\text{L}$
» Electrode material	
Working electrode (WE):	Gold
Reference electrode (RE):	Silver
Auxiliary electrode (AE):	Gold

## » Thick-film electrode packs

Thick-film 51PE electrodes are supplied in **50 units packs**. They should be stored at room temperature in a dry place.

## » Applications

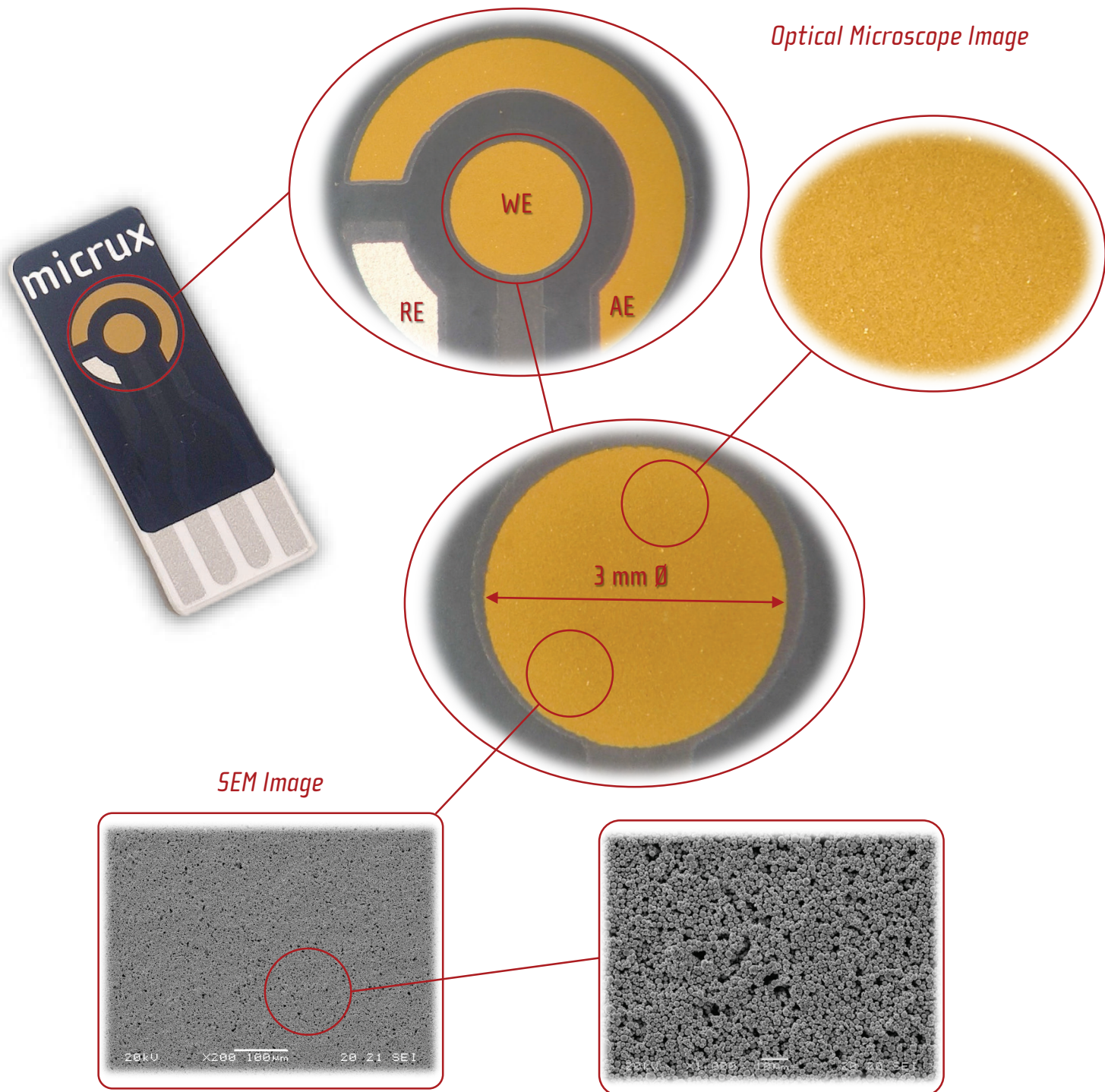
Printed electrodes are a suitable tool for **multiple applications**, providing many advantages such as low-cost, disposable, low reagent consumption as well as non-tedious pre-cleaning procedures.

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



## » Electrochemical cell

Gold (*Ref. ED-51PE-Au*) thick-film electrochemical sensors are based on a classical three-electrodes (working – WE, reference – RE and auxiliary – AE) approach.

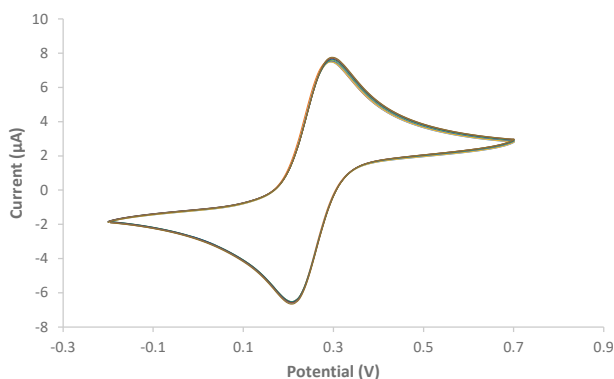


**Printed-based** electrodes are very useful in order to avoid tedious polishing of traditional solid electrodes, and make easier the development of **chemical-sensors** and **bio-sensors** for field analysis.

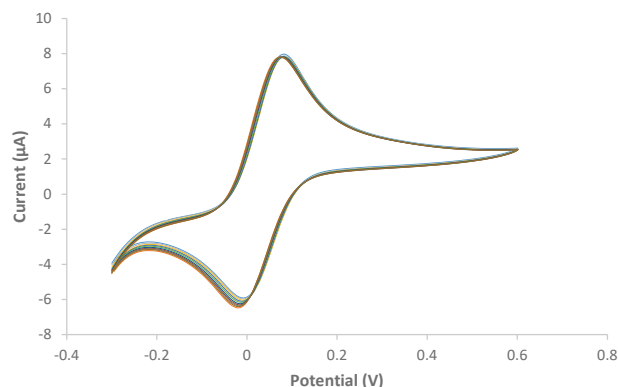


## » Thick-film gold electrodes performance

### » PRECISION INTRA-ELECTRODE

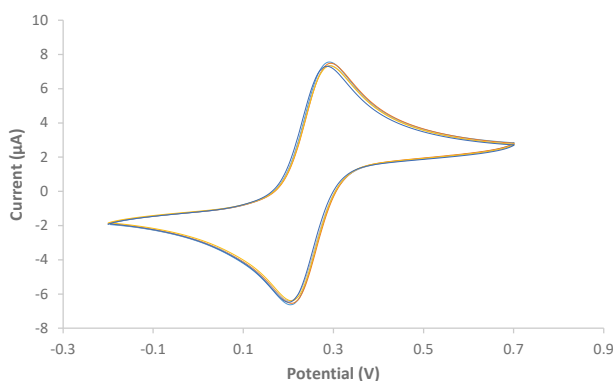


Successive cyclic voltammograms for 1 mM  $K_4Fe(CN)_6$  in 0.1 M  $H_2SO_4$  at the **same** thick-film gold electrode (ED-51PE-Au10).  $v = 50$  mV/s,  $n = 10$ ,  $RSD = 1\%$

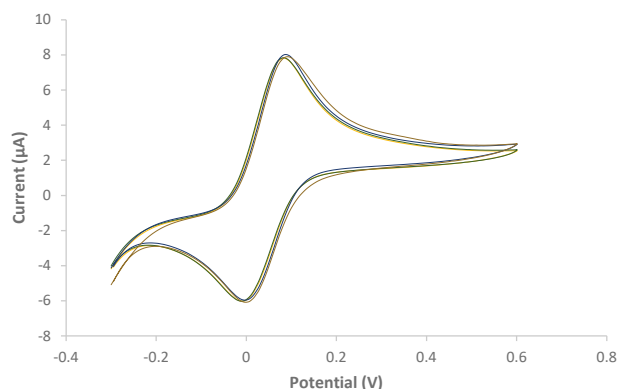


Successive cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M  $H_2SO_4$  at the **same** thick-film gold electrode (ED-51PE-Au10).  $v = 50$  mV/s,  $n = 10$ ,  $RSD = 1\%$

### » PRECISION INTER-ELECTRODE

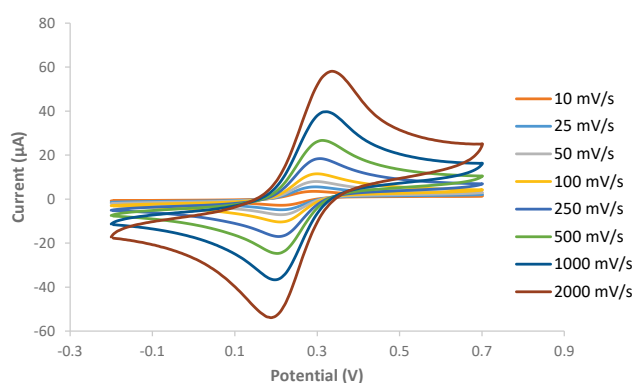


Cyclic voltammograms for 1 mM  $K_4Fe(CN)_6$  in 0.1 M  $H_2SO_4$  at **different** thick-film gold electrodes (ED-51PE-Au10).  $v = 50$  mV/s,  $n = 5$ ,  $RSD = 2\%$

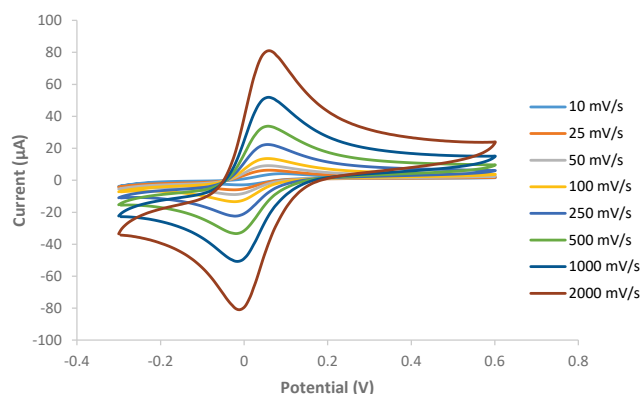


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M  $H_2SO_4$  at **different** thick-film gold electrodes (ED-51PE-Au10).  $v = 50$  mV/s,  $n = 5$ ,  $RSD = 3\%$

### » SWEEP RATE



Cyclic voltammograms for 1 mM  $K_4Fe(CN)_6$  in 0.1 M  $H_2SO_4$  using different **scan rates** at a thick-film gold electrode.

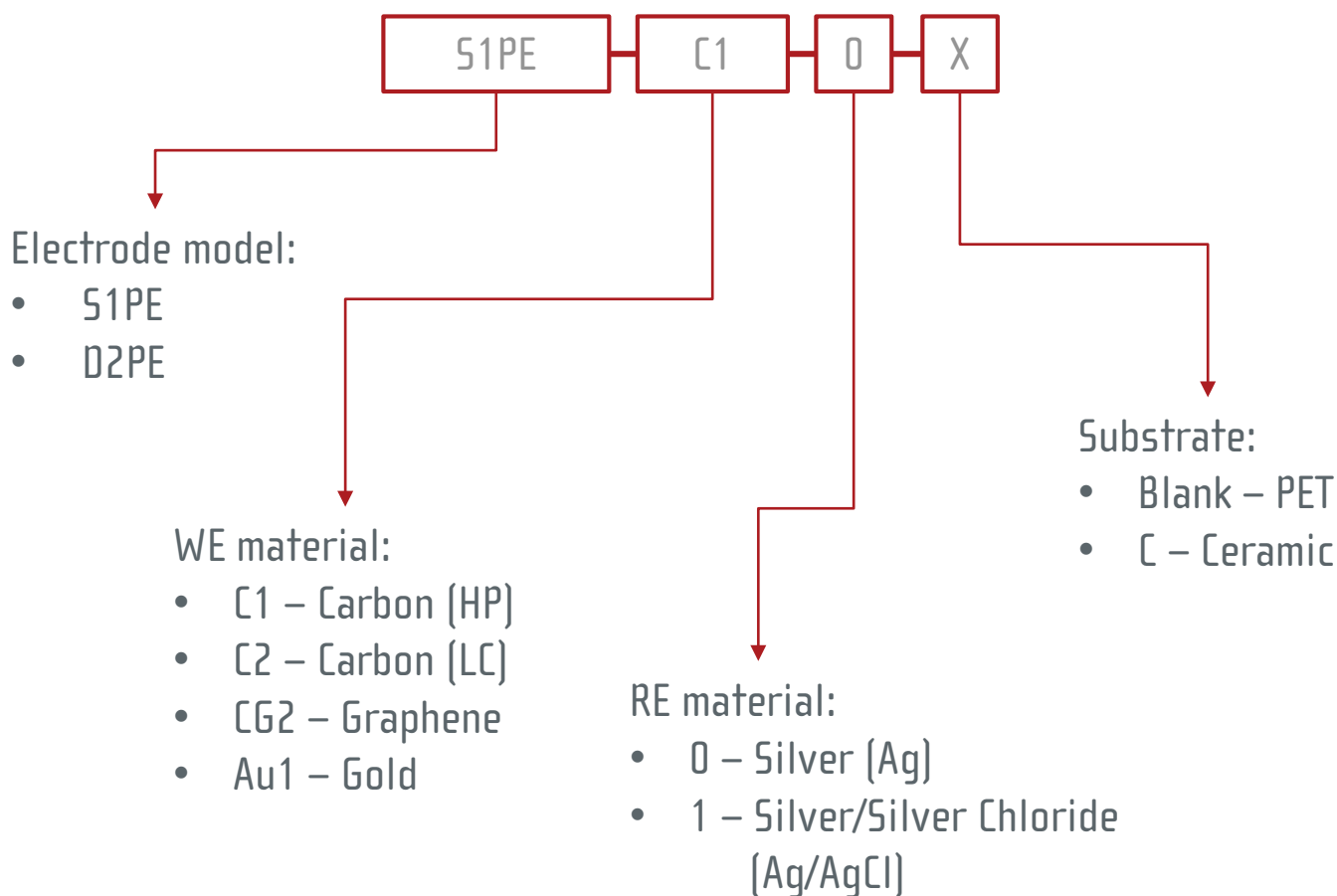


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M  $H_2SO_4$  using different **scan rates** at a thick-film gold electrode.

## » Thick-film electrodes selection

Screen-printed single electrodes (S1PE) are available in different materials (substrates and electrodes).

SKU	Substrate	WE	RE	AE
» ED-S1PE-C10	PET	Carbon	Silver	Carbon
» ED-S1PE-C10C	Ceramic	Carbon	Silver	Carbon
» ED-S1PE-C20	PET	Carbon	Silver	Carbon
» ED-S1PE-C20C	Ceramic	Carbon	Silver	Carbon
» ED-S1PE-C21	PET	Carbon	Silver/Silver Chloride	Carbon
» ED-S1PE-C21C	Ceramic	Carbon	Silver/Silver Chloride	Carbon
» ED-S1PE-CG20	PET	Graphene	Silver	Graphene
» ED-S1PE-CG21	PET	Graphene	Silver/Silver Chloride	Graphene
» ED-S1PE-Au10	PET	Gold	Silver	Gold
» ED-S1PE-Au10C	Ceramic	Gold	Silver	Gold



*Note: All combinations are NOT available. Please always check the availability for your specific needs.*

# Thick-film electrodes



## » Thick-film electrodes related accessories

Different **connectors** for interfacing the printed electrodes with any commercial potentiostat are also available at MicruX.

### » CABLE connector (ED-SPE-CABLE)



The **CABLE connector** (*Ref. ED-SPE-CABLE*) provides an interface between the electrodes (up to four contact pads) with the potentiostat, enabling the use of microvolume (20 – 50  $\mu$ L sample drops) or dipping into a solution. The cable ends are available with 2 mm female or male bananas.

*Dimensions: 50 cm long*

### » BOX Connector (ED-SPE-BOX)



The small **BOX connector** (*Ref. ED-SPE-BOX*) provides an interface between the electrodes (up to four contact pads) with any kind of potentiostat, enabling the use of microvolume (20 – 50  $\mu$ L sample drops). The interface ends are available with 2 mm female bananas.

*Dimensions: L58 x W40 x H15 mm*



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