

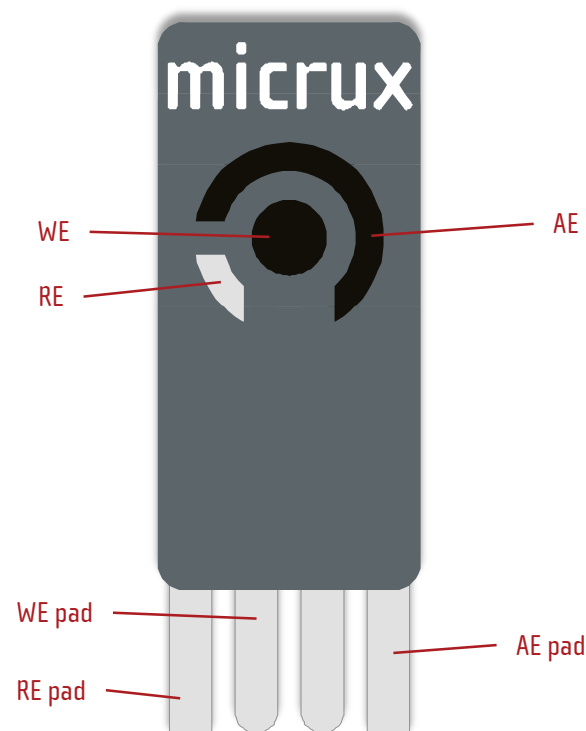


Thick-film Carbon Single-Electrodes



Thick-film carbon electrodes (ED-S1PE-C) 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 (Al ₂ O ₃)
» Substrate thickness:	350 µm / 380 µm
» WE dimensions:	3 mm Ø (7,1 mm ²)
» Sample volume:	20 – 50 µL
» Electrode material	
Working electrode (WE):	Carbon
Reference electrode (RE):	Silver
Auxiliary electrode (AE):	Carbon

» Thick-film electrode packs

Thick-film S1PE electrodes are supplied in **50 units packs**. They should be stored at room temperature in a dry place.

» Applications

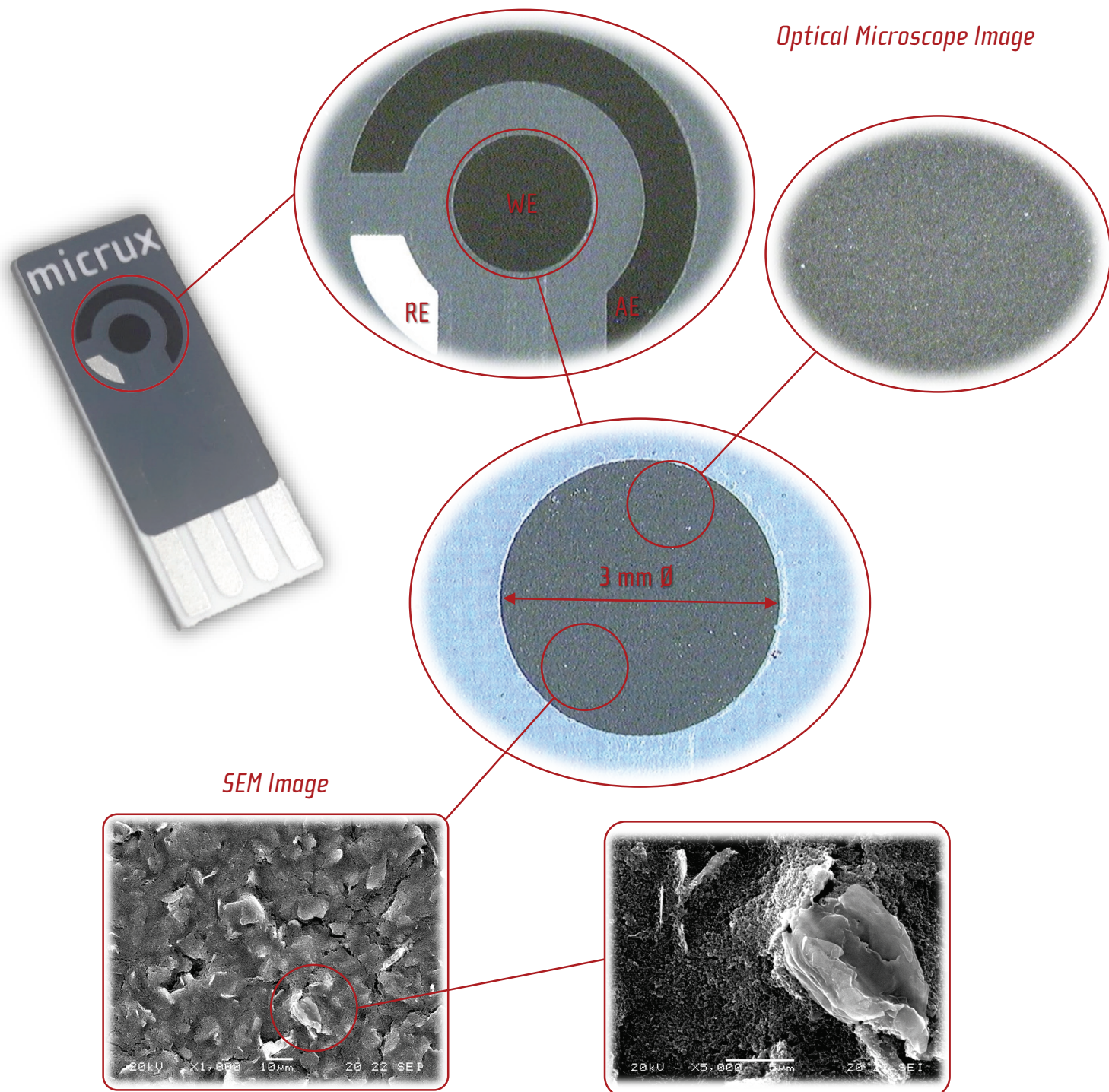
Printed electrodes are a suitable tool for **multiple applications**, providing many advantages such as low-cost, disposable, low reagent consumption as well as non-tedious pre-cleaning procedures.

Electroanalysis	Nanotechnology	Biosensors	Flow Analysis Systems
✓ Study EC reactions ✓ Trace EC analysis ✓ In-vivo measurements	✓ Modified electrodes ✓ New nanostructures ✓ New nanomaterials	✓ EC transducers ✓ New recognition elements ✓ POC / wearable systems	✓ FIA Systems ✓ HPLC ✓ Capillary Electrophoresis



» Electrochemical cell

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

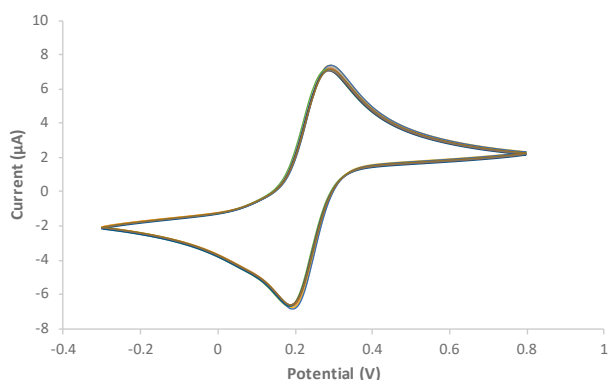


Printed-based electrodes are very useful in order to avoid tedious polishing of traditional solid electrodes, and make easier the development of **chemical-sensors** and **bio-sensors** for field analysis.

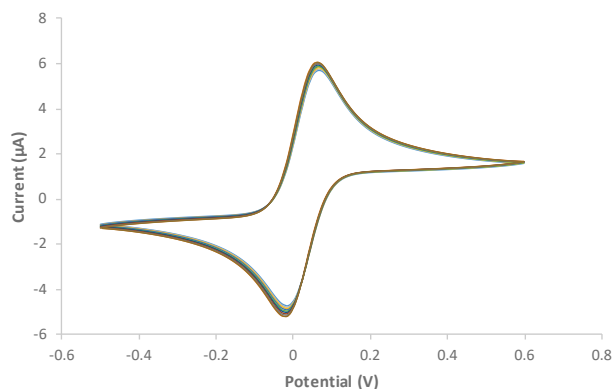


» Thick-film carbon electrodes performance

» PRECISION INTRA-ELECTRODE

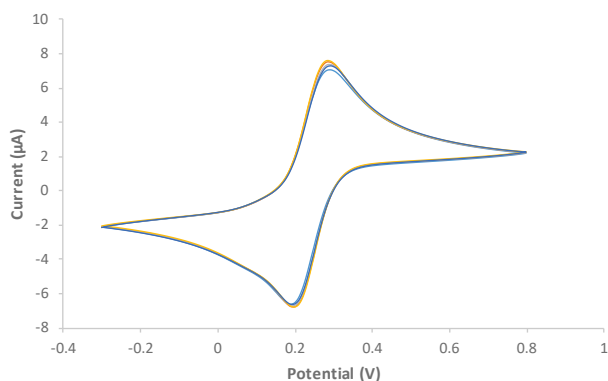


Successive cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M H_2SO_4 at the **same** thick-film carbon electrode (ED-51PE-C10). $v = 50$ mV/s, $n = 10$, $RSD = 2\%$

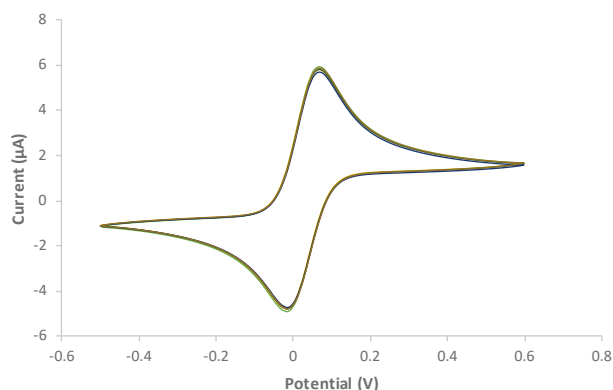


Successive cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 at the **same** thick-film carbon electrode (ED-51PE-C10). $v = 50$ mV/s, $n = 10$, $RSD = 2\%$

» PRECISION INTER-ELECTRODE

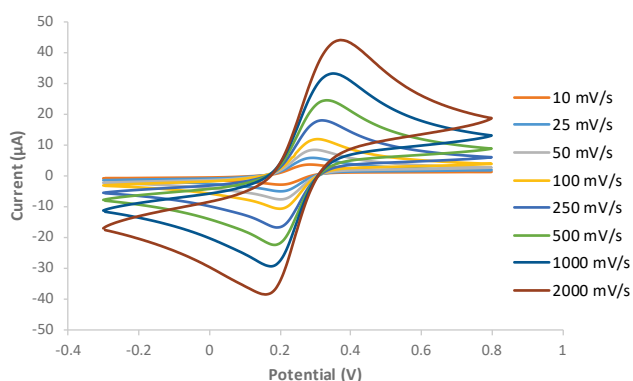


Cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M H_2SO_4 at **different** thick-film carbon electrodes (ED-51PE-C10). $v = 50$ mV/s, $n = 5$, $RSD = 3\%$

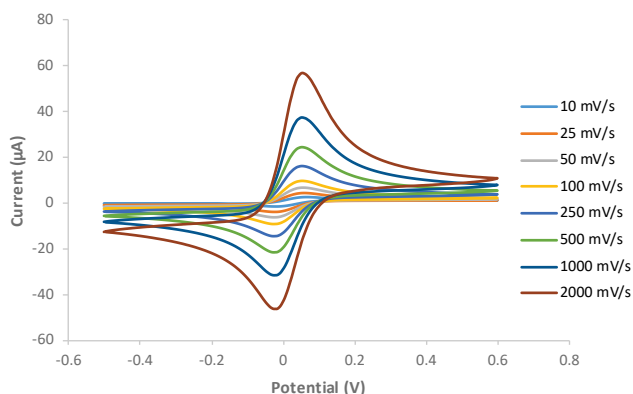


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 at **different** thick-film carbon electrodes (ED-51PE-C10). $v = 50$ mV/s, $n = 5$, $RSD = 2\%$

» 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 carbon electrode.

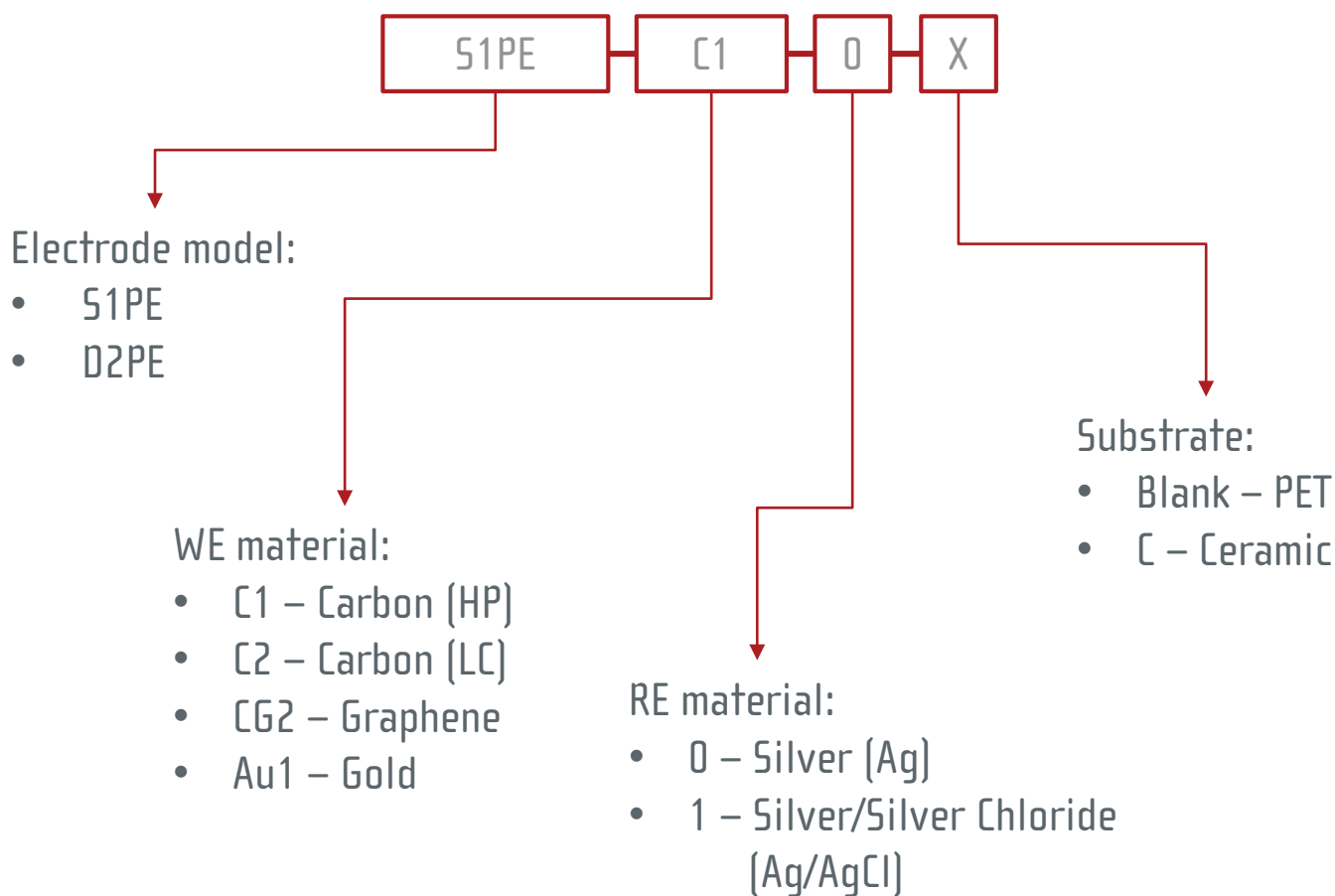


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 using different **scan rates** at a thick-film carbon electrode.

» 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-C21	PET	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.

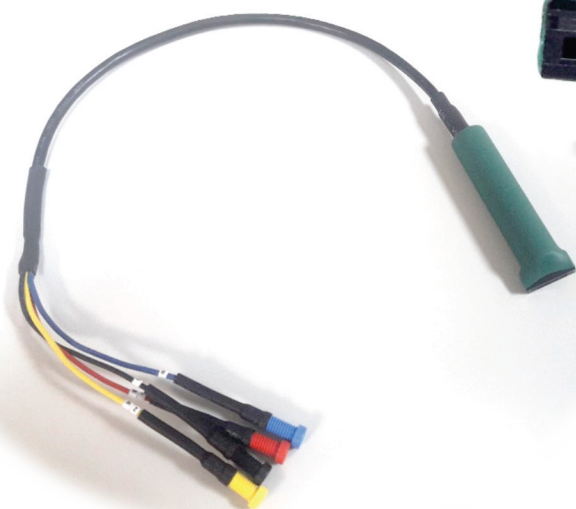
Thick-film electrodes



» 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 μ 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 μ L sample drops). The interface ends are available with 2 mm female bananas.

Dimensions: L58 x W40 x H15 mm