

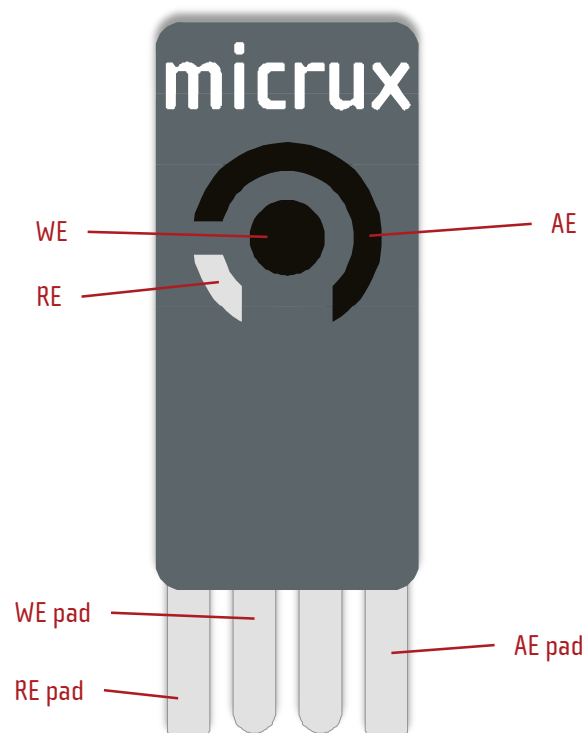


Thick-film Carbon Single-Electrodes



Thick-film carbon electrodes (ED-51PE-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_2O_3)
- » **Substrate thickness:** 350 μm / 380 μm
- » **WE dimensions:** 3 mm \varnothing (7,1 mm²)
- » **Sample volume:** 20 – 50 μL
- » **Electrode material**
 - Working electrode (WE):** Carbon
 - Reference electrode (RE):** Silver (or Ag/AgCl)
 - Auxiliary electrode (AE):** Carbon

» 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

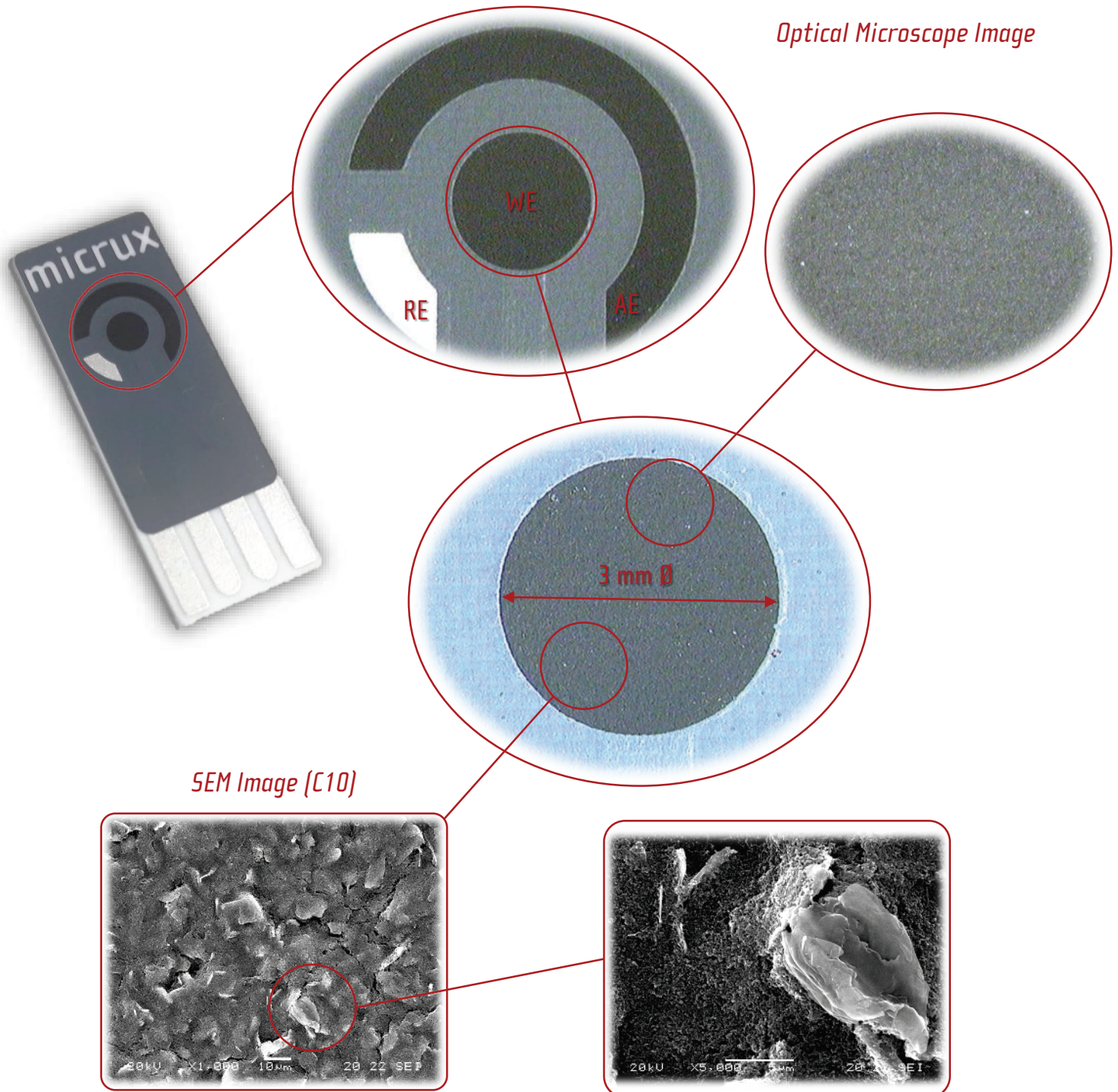
Printed electrodes are a suitable tool for **multiple applications**, providing many advantages such as low-cost, disposable, low reagent consumption as well as non-tedious pre-cleaning procedures.

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

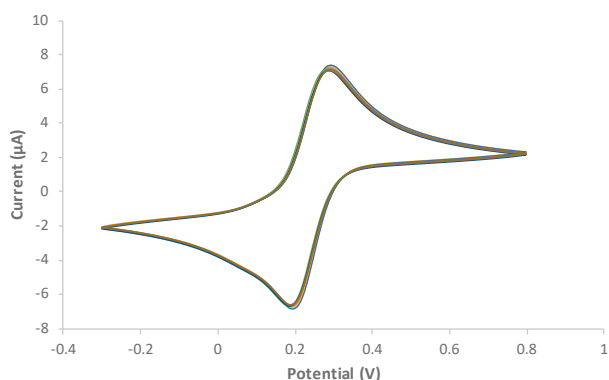


Printed-based electrodes are very useful in order to avoid tedious polishing of traditional solid electrodes, and make easier the development of **chemical-sensors** and **bio-sensors** for field analysis.

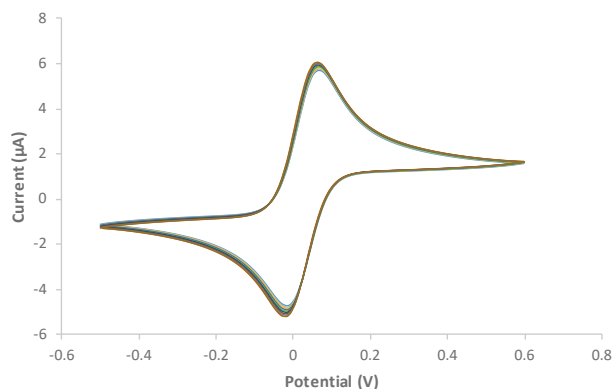


» Thick-film carbon electrodes performance

» PRECISION INTRA-ELECTRODE

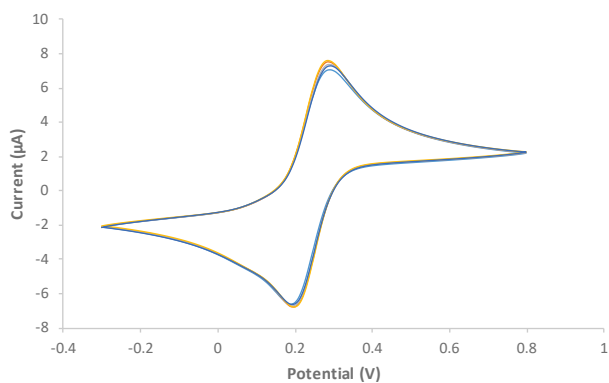


Successive cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M H_2SO_4 at the **same** thick-film carbon electrode (ED-51PE-C10). $v = 50$ mV/s, $n = 10$, $RSD = 2\%$

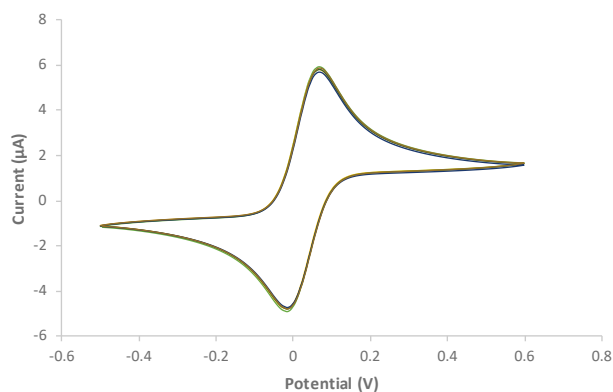


Successive cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 at the **same** thick-film carbon electrode (ED-51PE-C10). $v = 50$ mV/s, $n = 10$, $RSD = 2\%$

» PRECISION INTER-ELECTRODE

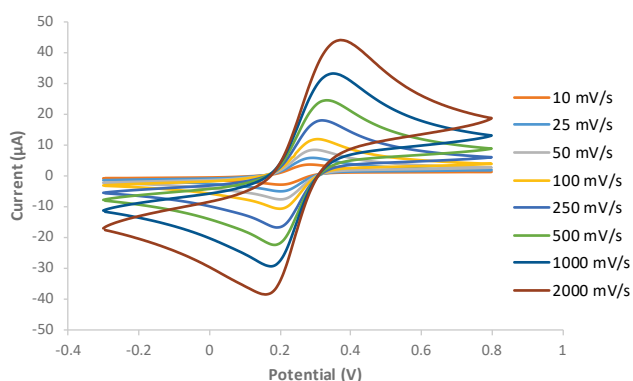


Cyclic voltammograms for 1 mM $K_4Fe(CN)_6$ in 0.1 M H_2SO_4 at **different** thick-film carbon electrodes (ED-51PE-C10). $v = 50$ mV/s, $n = 5$, $RSD = 3\%$

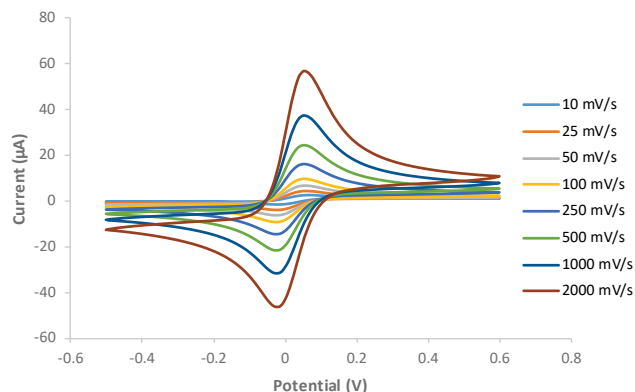


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 at **different** thick-film carbon electrodes (ED-51PE-C10). $v = 50$ mV/s, $n = 5$, $RSD = 2\%$

» 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.

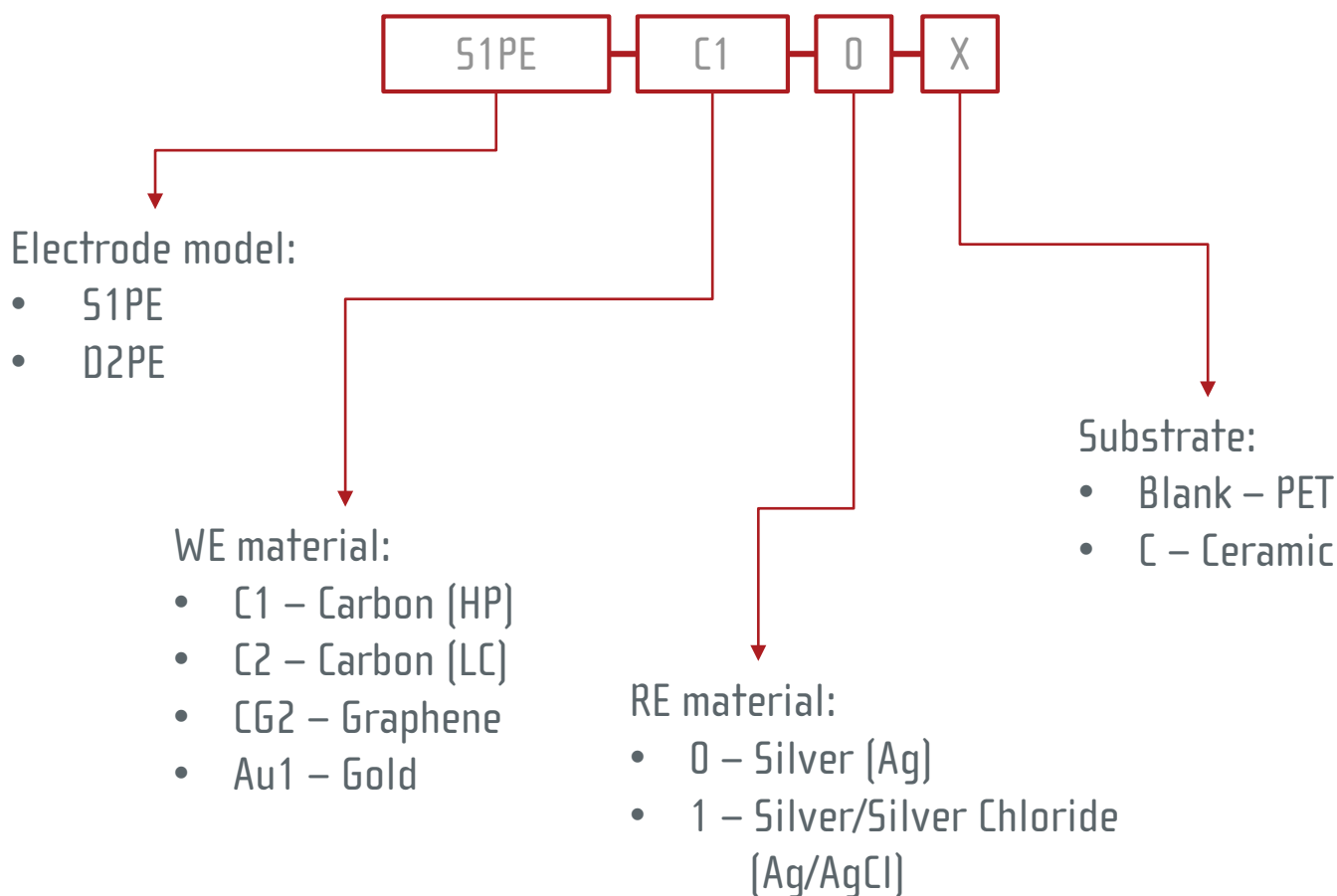


Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H_2SO_4 using different **scan rates** at a thick-film carbon electrode.

» 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-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



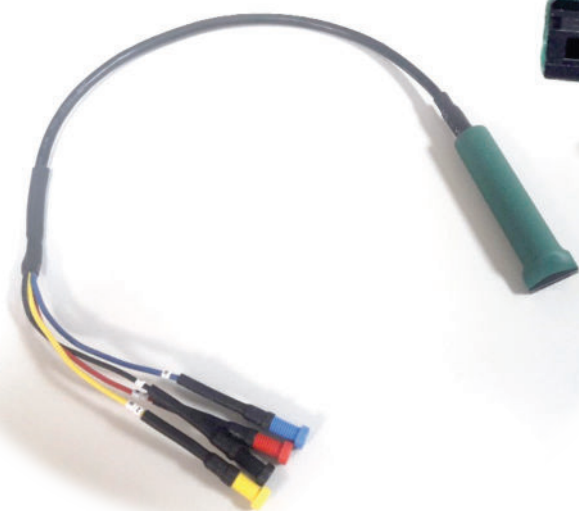
Note: All combinations are NOT available. Please always check the availability for your specific needs.



» Thick-film electrodes 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



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