

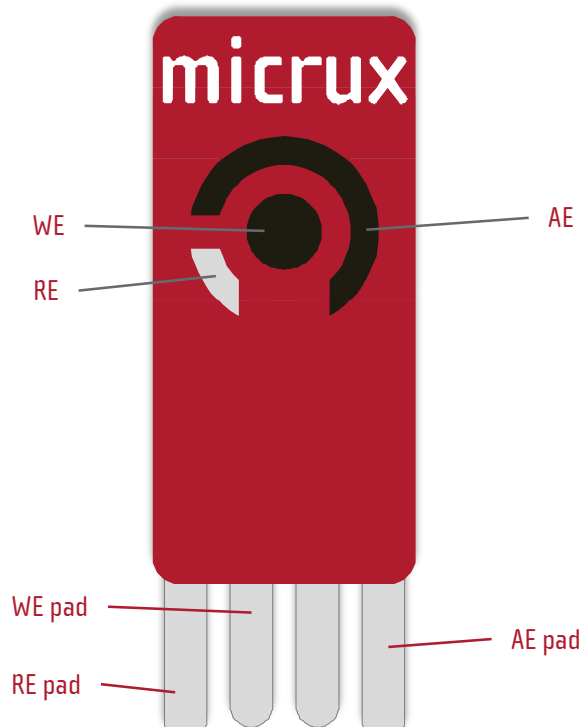


# Thick-film Graphene Single-Electrodes



High-conductivity graphene-based electrodes (*ED-51PE-CG*) 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:** 250  $\mu m$  / 380  $\mu m$
- » **WE dimensions:** 3 mm  $\varnothing$  (7,1 mm<sup>2</sup>)
- » **Sample volume:** 20 – 50  $\mu L$
- » **Electrode material**
  - Working electrode (WE):** Graphene
  - Reference electrode (RE):** Silver (or Ag/AgCl)
  - Auxiliary electrode (AE):** Graphene

## » 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

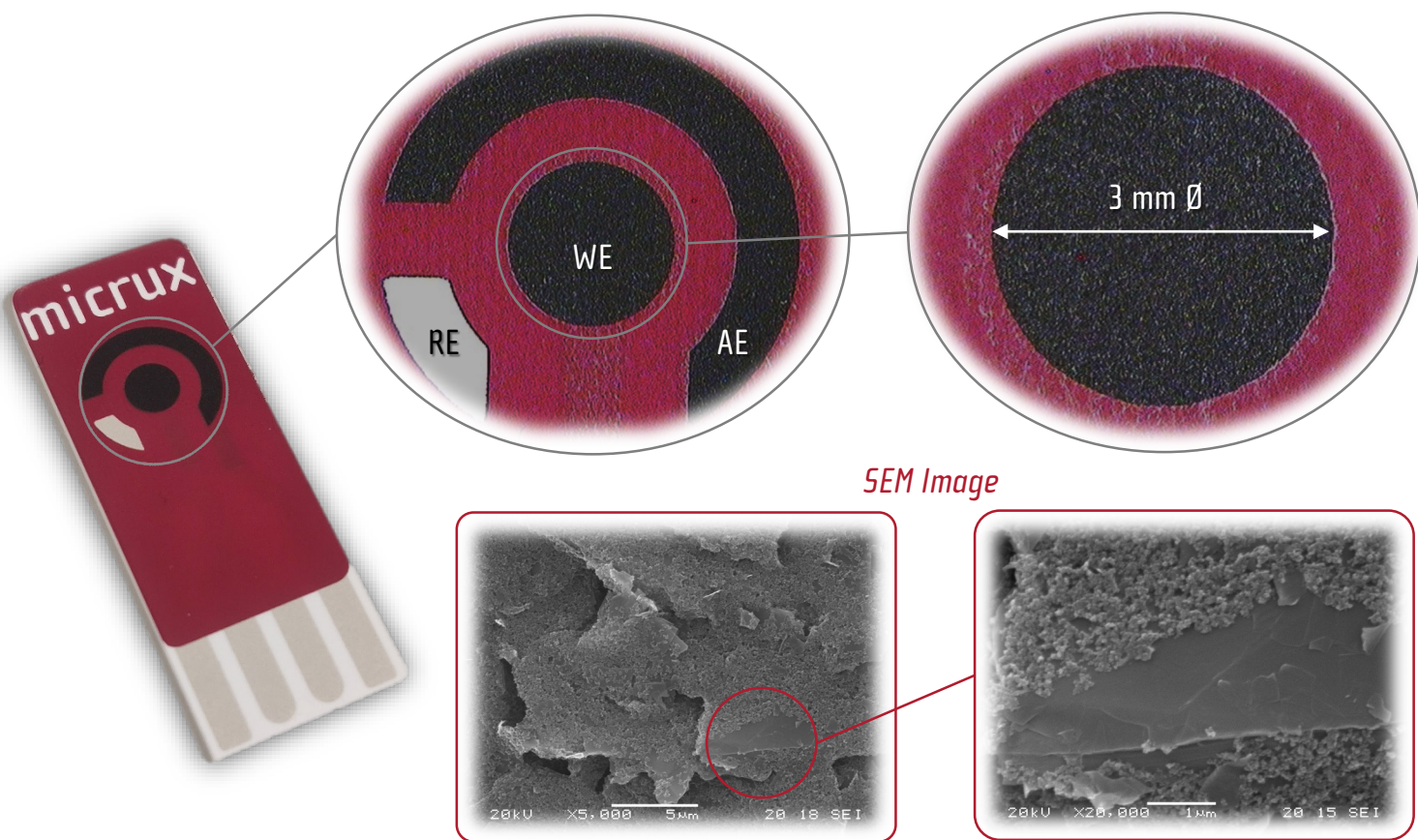
Printed electrodes are a suitable tool for **multiple applications**, providing many advantages such as low-cost, disposable, low reagent consumption as well as non-tedious pre-cleaning procedures.

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>



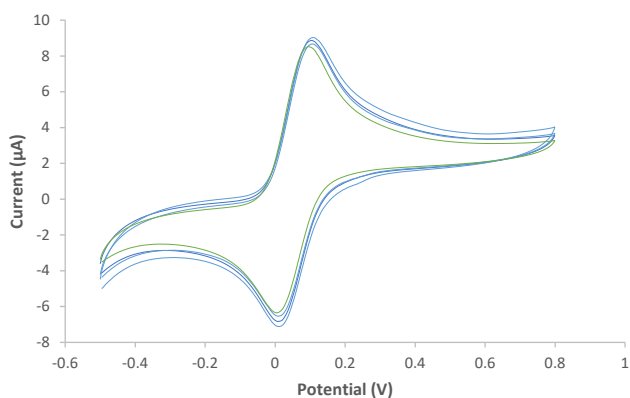
## » Electrochemical cell

Graphene (*Ref. ED-S1PE-CG*) thick-film electrochemical sensors are based on a classical three-electrodes (working – WE, reference – RE and auxiliary – AE) approach.

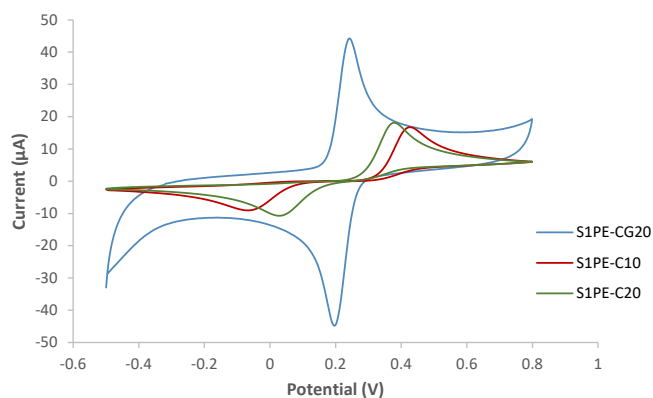


Graphene-based electrodes have a very low electrical resistance with a good scratch resistance for using in a wide variety of applications, including the development of low-cost chemical-sensors and bio-sensors for field analysis.

## » Thick-film graphene-based electrodes performance



Cyclic voltammograms for 1 mM ferrocene methanol in 0.1 M H<sub>2</sub>SO<sub>4</sub> at the same thick-film carbon electrode (ED-S1PE-CG20).  $v = 50$  mV/s.

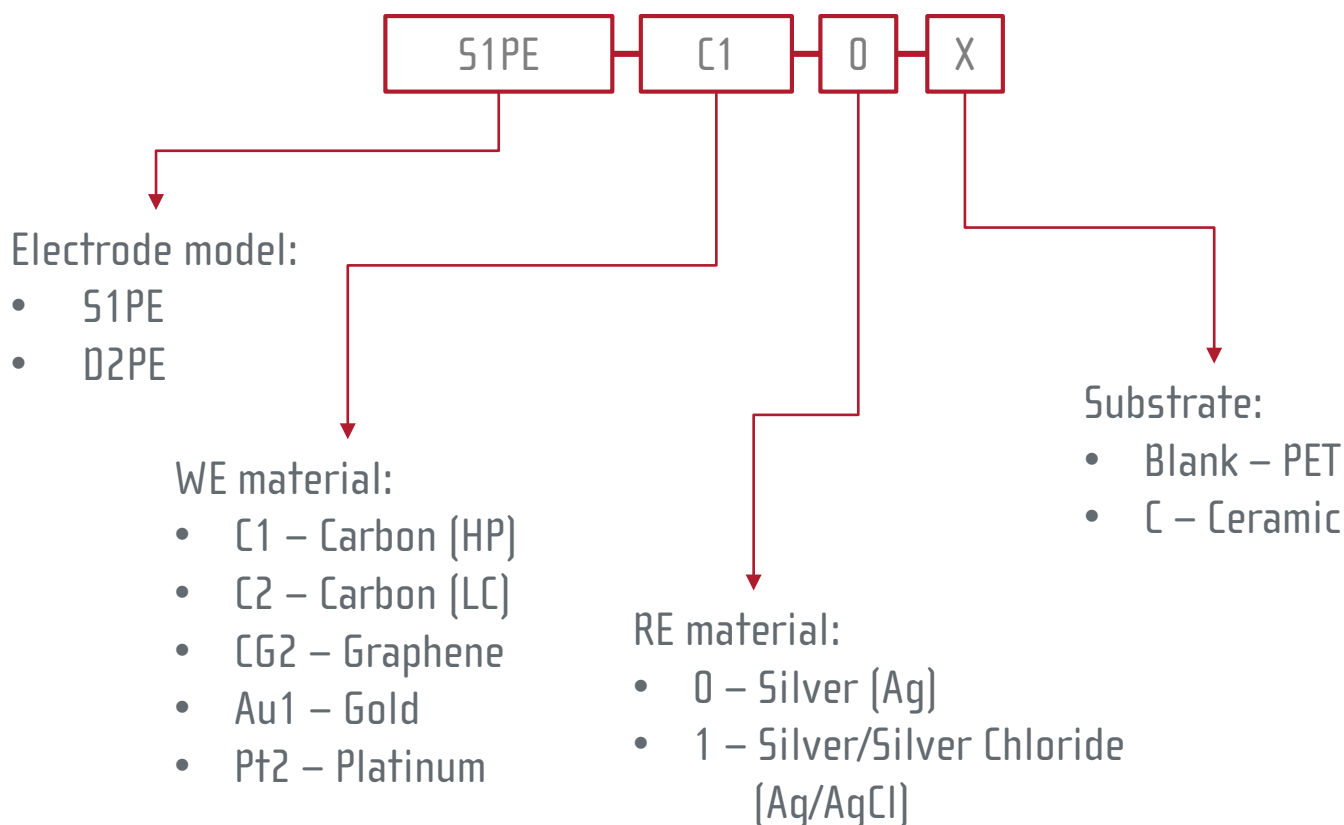


Cyclic voltammograms for 1 mM hydroquinone in 0.1 M H<sub>2</sub>SO<sub>4</sub> at different thick-film carbon (ED-S1PE-C10 / ED-S1PE-C20) and activated graphene-based electrodes (ED-S1PE-CG20).  $v = 50$  mV/s.

## » 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-CG20C	Ceramic	Graphene	Silver	Graphene
» ED-S1PE-CG21	PET	Graphene	Silver/Silver Chloride	Graphene
» ED-S1PE-CG21C	Ceramic	Graphene	Silver/Silver Chloride	Graphene
» ED-S1PE-Au10	PET	Gold	Silver	Gold
» ED-S1PE-Au10C	Ceramic	Gold	Silver	Gold
» ED-S1PE-Pt20	PET	Platinum	Silver	Platinum



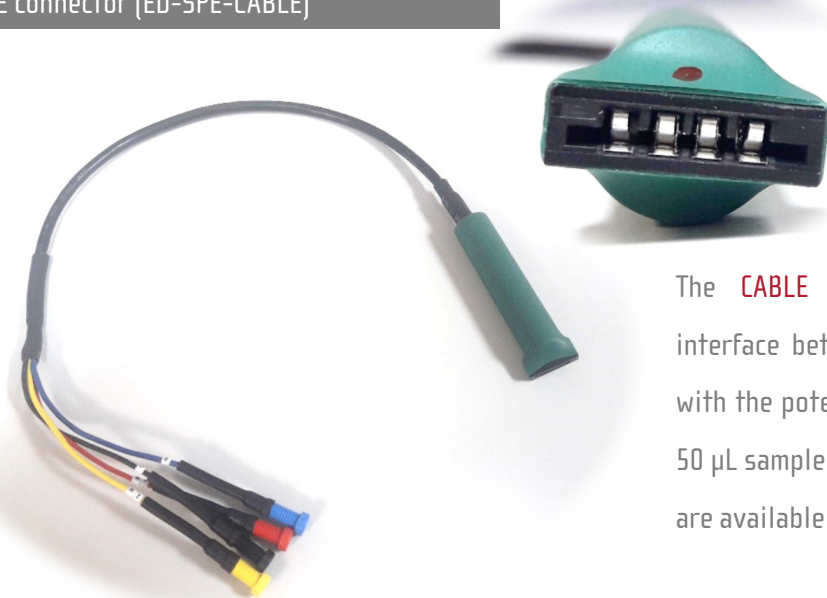
Note: All combinations are NOT available. Please always check the availability for your specific needs.



## » 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  $\mu$ 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*



Mora-Garay Industrial Park  
Juan de la Cierva, 2C, Bldg. # 6  
33211 · Gijón (Asturias) · SPAIN

Phone/FAX: +34 984151019

E-mail: [info@micruxfluidic.com](mailto:info@micruxfluidic.com)

Web: [www.micruxfluidic.com](http://www.micruxfluidic.com)

