



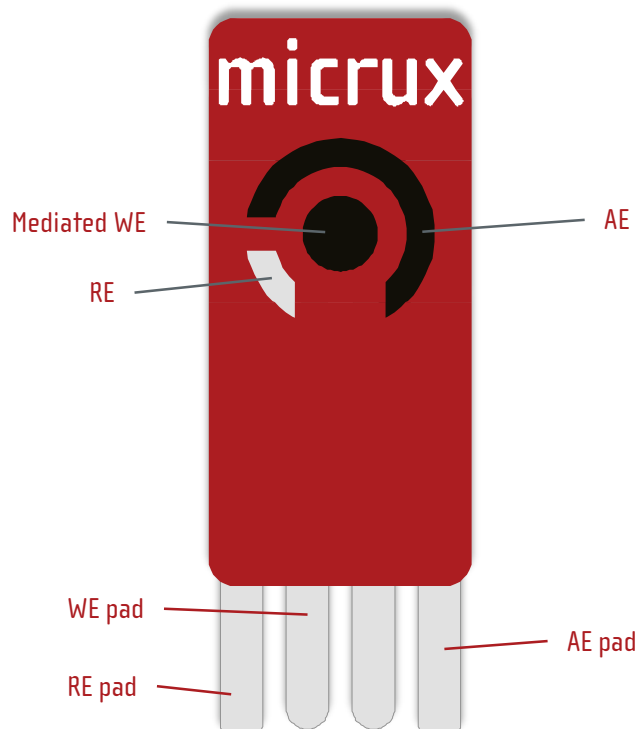
# Thick-film Carbon Mediated Electrodes



Carbon-mediated electrodes (*ED-51PE-C20/MED*) are fabricated by **printing technologies** on a flexible and high-resist PET 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)
» Substrate thickness:	350 $\mu\text{m}$
» WE dimensions:	3 mm $\varnothing$ (7,1 mm <sup>2</sup> )
» Sample volume:	20 – 50 $\mu\text{L}$
» Electrode material	
Working electrode (WE):	Carbon/Mediator*
Reference electrode (RE):	Silver
Auxiliary electrode (AE):	Carbon

\*Mediator: FeCN (Potassium Ferrocyanide), PB (Prussian Blue), CoPc (Cobalt (II) Phthalocyanine)

## » Thick-film electrode packs

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

## » Applications

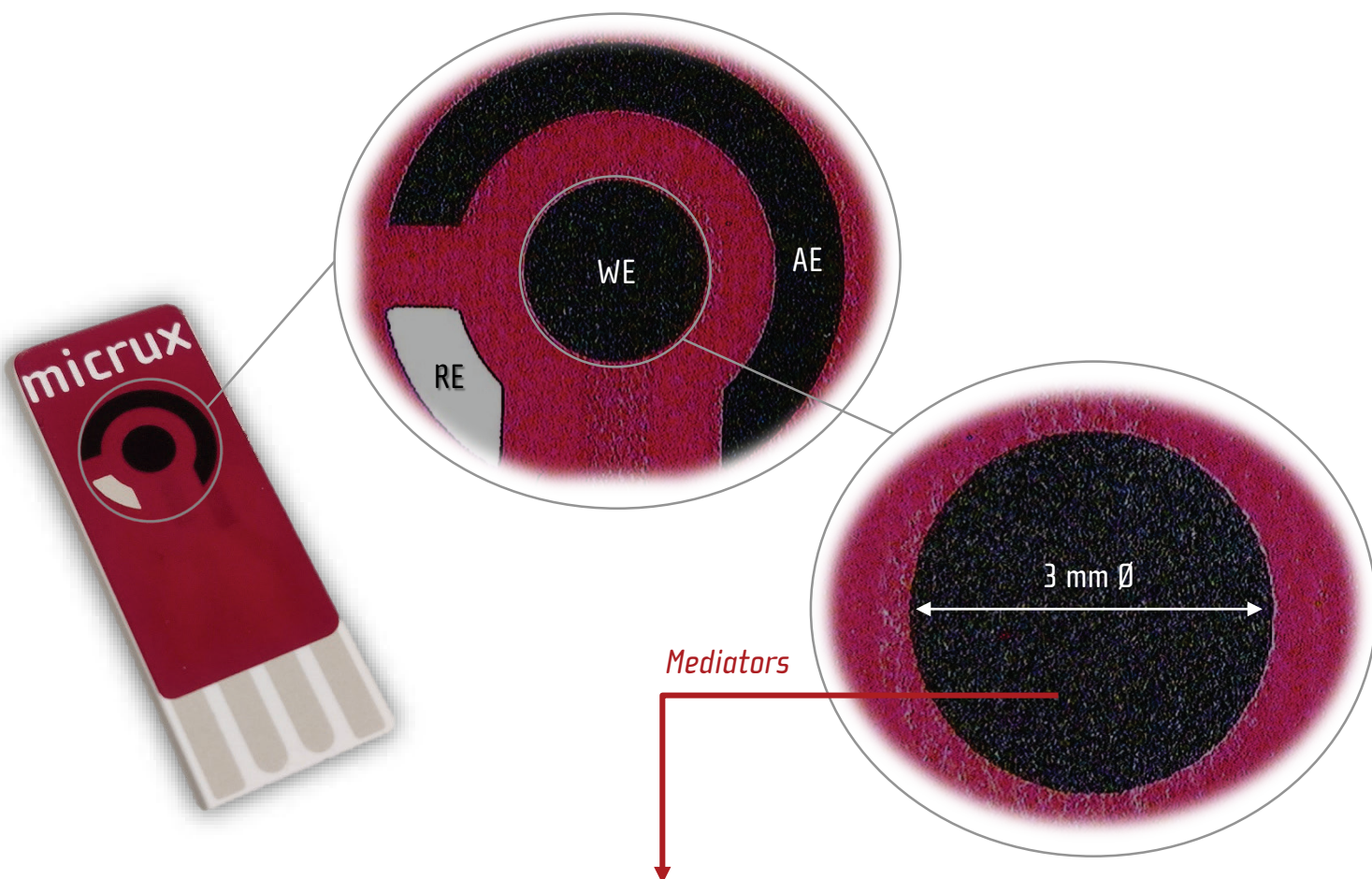
Printed electrodes are a suitable tool for **multiple applications**, providing many advantages such as low-cost, disposable, low reagent consumption as well as non-tedious pre-cleaning procedures.

Carbon-mediated electrodes have been optimized to provide superior electrochemical performance, enabling the detection of many analytes when used in conjunction with specific **oxidase** type **enzymes**. These mediated-electrodes are suitable for improving the detection of **hydrogen peroxide** and the development of **enzyme-based biosensors**.

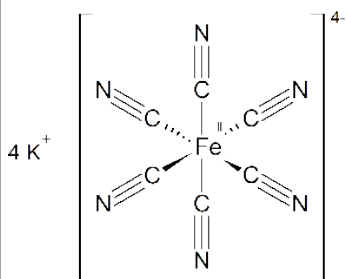


## » Electrochemical cell

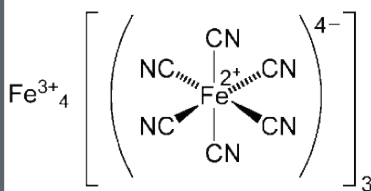
Mediated (*Ref. ED-51PE-C20/MED*) thick-film electrochemical sensors are based on a classical three-electrodes (working – WE, reference – RE and auxiliary – AE) approach.



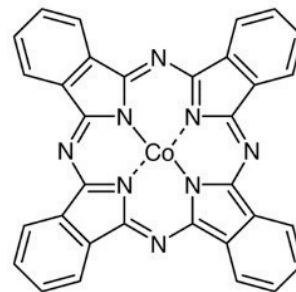
### Potassium Ferrocyanide



### Prussian Blue



*Cobalt(II) Phthalocyanine*

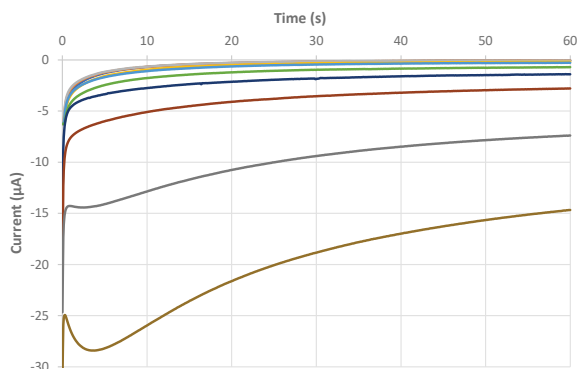


Reference	Substrate	WE	RE	AE
» <i>ED-51PE-C20/FeCN</i>	PET	Carbon/K <sub>4</sub> Fe(CN) <sub>6</sub>	Silver	Carbon
» <i>ED-51PE-C20/PB</i>	PET	Carbon/Prussian Blue	Silver	Carbon
» <i>ED-51PE-C20/CoPc</i>	PET	Carbon/Cobalt Phthalocyanine	Silver	Carbon

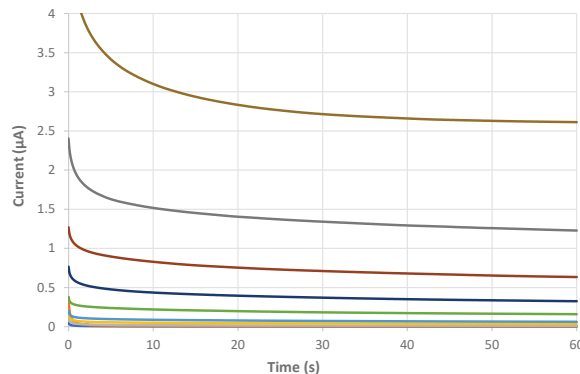


## » Thick-film mediated-electrodes performance

### » BATCH ANALYSIS

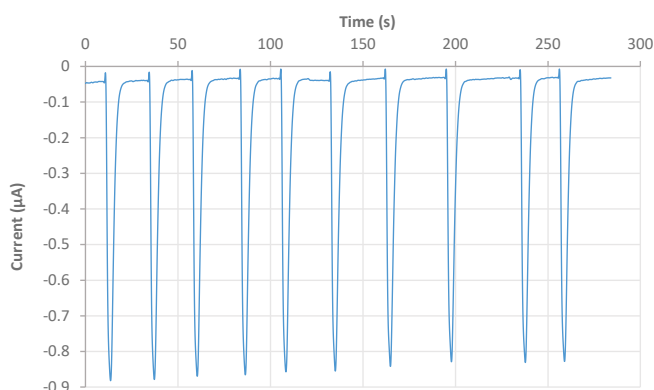


Amperometric response for 10  $\mu\text{M}$  to 5 mM  $\text{H}_2\text{O}_2$  using different thick-film Carbon/Prussian Blue electrodes (ED-51PE-C20/PB).  $E_d = -0.1$  V, BGE: PBS pH = 7.4.

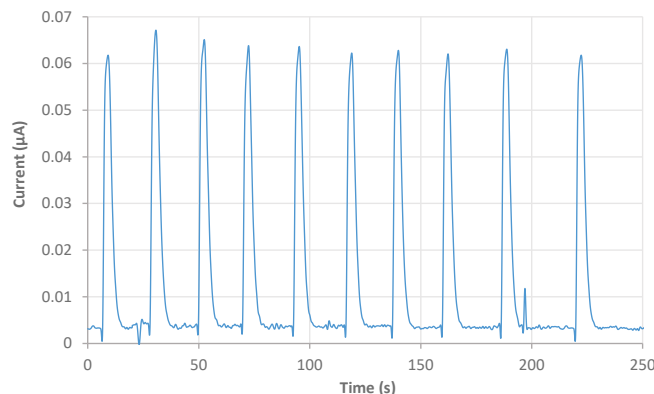


Amperometric response for 1  $\mu\text{M}$  to 5 mM  $\text{H}_2\text{O}_2$  using different thick-film Carbon/Cobalt Phthalocyanine electrodes (ED-51PE-C20/CoPc).  $E_d = +0.4$  V, BGE: PBS pH = 7.4.

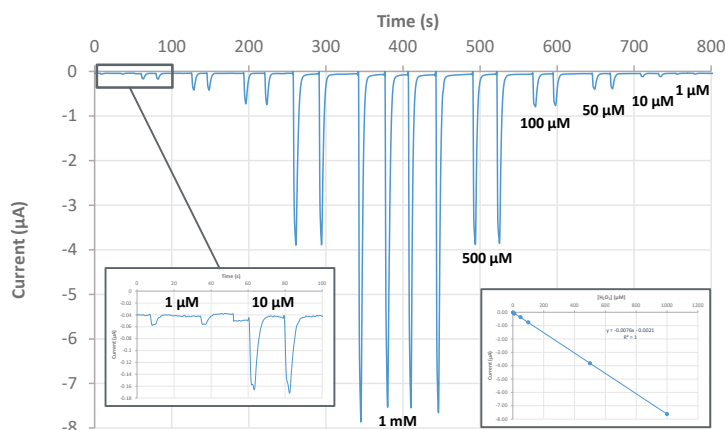
### » FIA SYSTEM



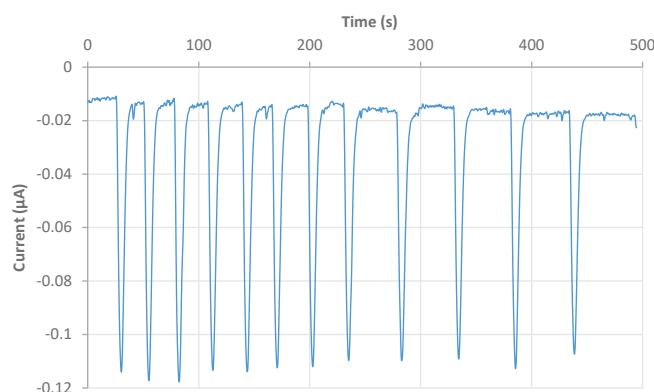
Successive injections of 100  $\mu\text{M}$   $\text{H}_2\text{O}_2$  in a FIA system using a thick-film Carbon/Prussian Blue electrode (ED-51PE-C20/PB).  $E_d = -0.1$  V, flow rate: 2 mL/min, carrier: PBS pH = 7.4.  $RSD = 3.0\%$  ( $n = 10$ )



Successive injections of 100  $\mu\text{M}$   $\text{H}_2\text{O}_2$  in a FIA system using a thick-film Carbon/Cobalt Phthalocyanine electrode (ED-51PE-C20/CoPc).  $E_d = +0.4$  V, flow rate: 2 mL/min, carrier: PBS pH = 7.4.  $RSD = 2.5\%$  ( $n = 10$ )



Amperometric response for 1  $\mu\text{M}$  to 1 mM  $\text{H}_2\text{O}_2$  in a FIA system using a thick-film Carbon/Prussian Blue electrode (ED-51PE-C20/PB).  $E_d = -0.1$  V, flow rate: 2 mL/min, carrier: PBS pH = 7.4.



Successive injections of 100  $\mu\text{M}$   $\text{H}_2\text{O}_2$  in a FIA system using a thick-film Carbon/Potassium Ferrocyanide electrode (ED-51PE-C20/FeCN).  $E_d = -0.1$  V, flow rate: 1 mL/min, carrier: PBS pH = 7.4.  $RSD = 4.5\%$  ( $n = 12$ )

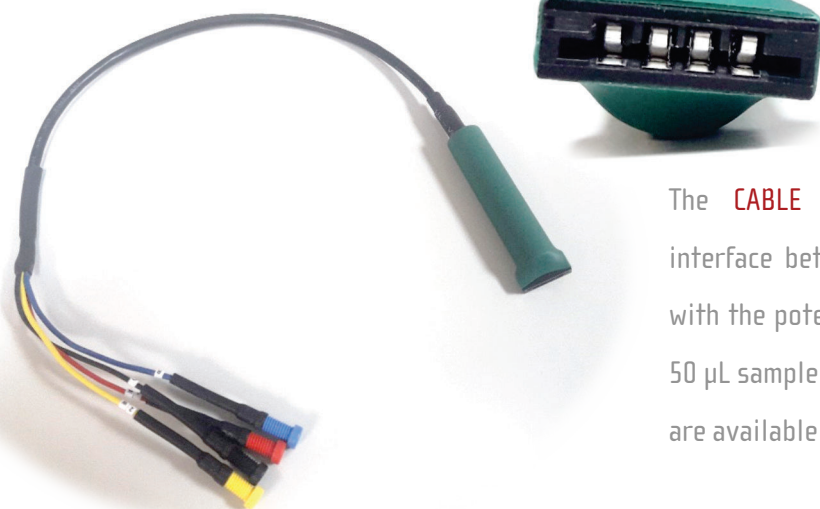
# Thick-film electrodes



## » 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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