eChem-Gold™
Thin-film planar gold electrodes

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AquAffirm

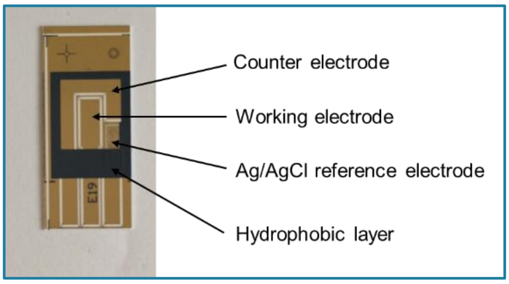
Description

Part No. Au-5-001

Our thin-film planar gold electrodes are fabricated using high-resolution laser ablation of sputtered gold on a PET substrate with the cell volume delimited by screen-printed hydrophobic ink. Precision manufacture ensures excellent consistency and sensor-to-sensor reproducibility.

These are ideal for electrochemical research and analysis in environmental, clinical or agri-food areas and for electrochemical biosensor development.

With counter electrode, working electrode and screen-printed reference electrode made of Ag/AgCl, our electrodes are designed for robust electrochemistry research, with sensor-to-sensor reproducibility a key requirement.



Applications

Key properties of these thin-film electrodes include their low-cost, high-resolution fabrication, disposability, and low reagent consumption. This results in an easy-to-use base for multiple research applications:

Biosensors

- Electrochemical transducers
- Environmental sensors
- Point-of-care tests

Electrochemistry

- Electrochemical research/analysis
- Student research projects/practicals
- *In vivo* diagnostics research

Flow systems & microfluidics

- Microfluidics research
- Flow systems
- Bioassays

Nanotechnology

- Modified electrodes
- Nanostructure research
- Nanomaterial research

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Technical data

Reproducibility

Cyclic Voltammetry of Potassium Ferricyanide ($K_3Fe(CN)_6$)

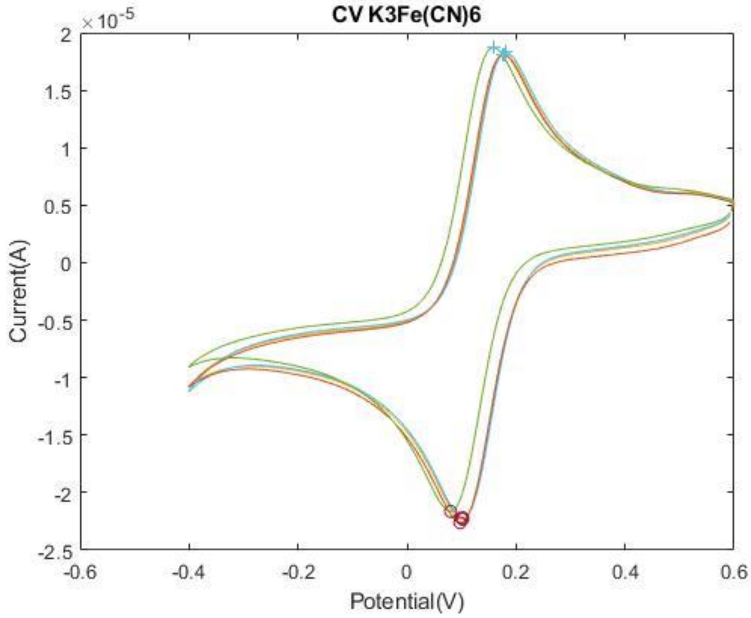

Fig.1: Cyclic voltammograms for 1mM $K_3Fe(CN)_6$, for 5 different sensors.

Sensitivity

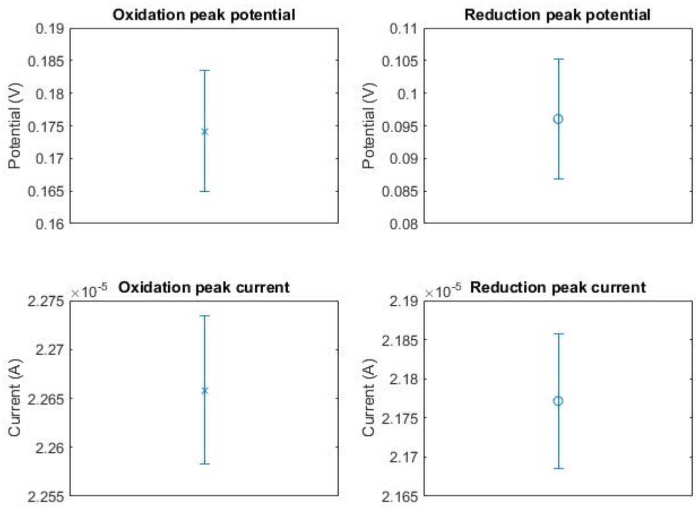

Fig.2: Oxidation (x) and reduction (o) peak potential and peak height variation for 5 sensors.

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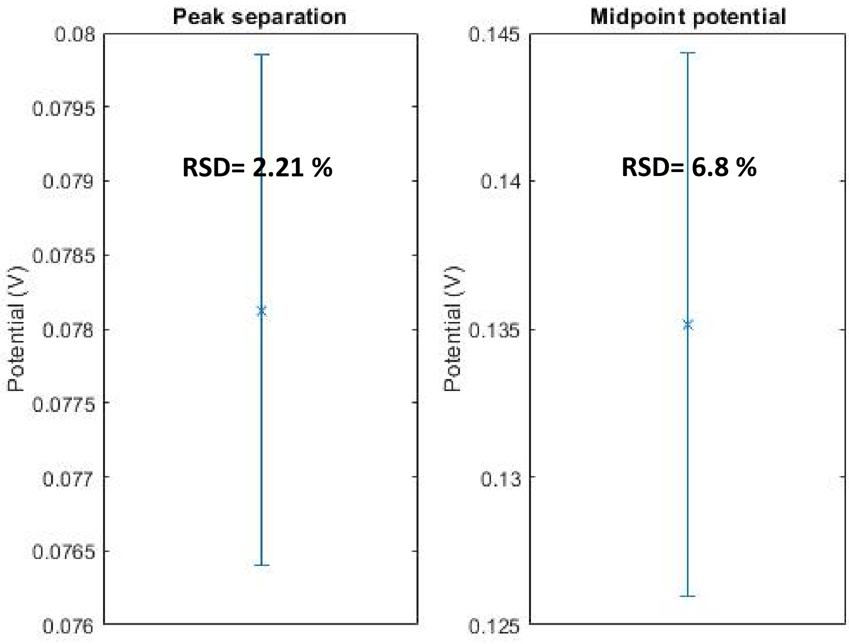

Fig.3: Average redox peak separation and equilibrium potential for 5 electrodes. (*RSD= Relative Standard Deviation)

Variable scan rate

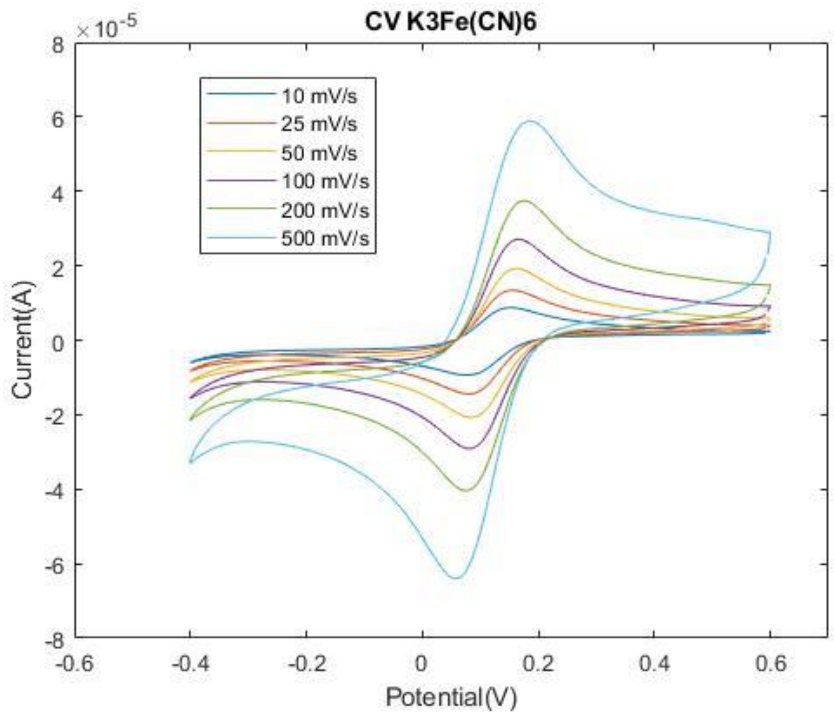

Fig.4: Cyclic voltammograms for 1mM $K_3Fe(CN)_6$, for 1 sensor at different scan rates.

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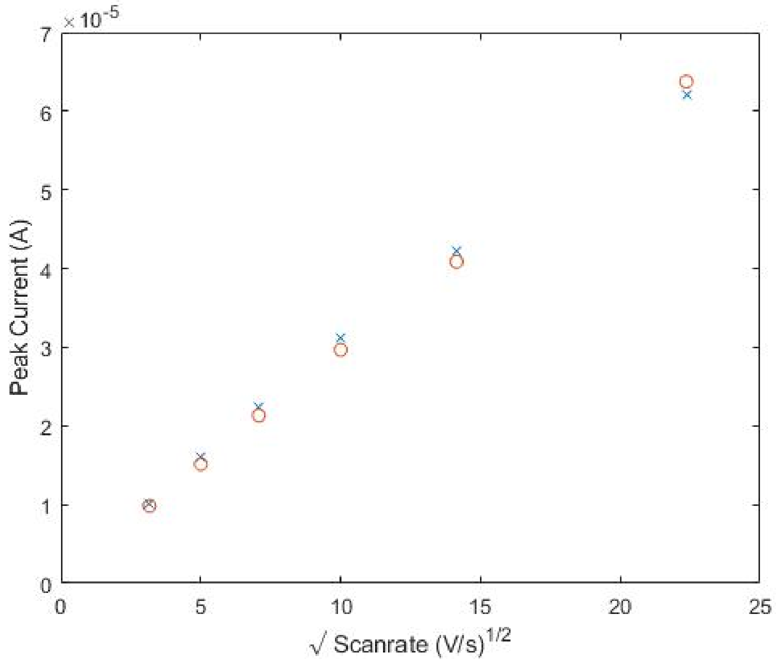

Fig.5: Peak height Vs √Scan rate for oxidation (x) and reduction (o) peaks.

Cyclic Voltammetry of Potassium Ferricyanide ($K_3Fe(CN)_6$)

Protocol

Pre-cleaning protocol:

1) Prepare 0.5M H_2SO_4 (99.9%)
2) Dispense 150uL on the electrode
3) Perform a CV

CV settings

- Scan rate: 100mV/s
- Start E: 0V
- Upper E: 1.3V
- Lower E: -0.5
- # of scans: 10

Potassium ferricyanide $K_3Fe(CN)_6$ protocol:

1) Prepare 1mM $K_3Fe(CN)_6$ & 10mM phosphate (pH=7) & 100mM KCl
2) Dispense 150uL on the electrode
3) Perform a CV

CV settings

- Scan rate: 50mV/s (Variable)
- Start E: 0.6V
- Upper E: 0.6V
- Lower E: -0.4V
- # of scans: 3

Procedure:

1) Perform an acid clean followed by washing the electrode with distilled ultra-pure (18 MΩ cm^{-1}) water & dry with nitrogen gas
2) Once the electrode surface is dried perform a CV with potassium ferricyanide ($K_3Fe(CN)_6$)
3) Repeat steps 1and 2 for each electrode

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