

## Electropolymerized Fe-Protoporphyrin IX And Cu-Protoporphyrin IX Mimicking Cytochrome-c Oxidase Activity.

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Chemically modified electrodes have been prepared alternating layers of electropolymerized Fe-Protoporphyrin IX (PPIX) and Cu-PPIX<sup>1,2</sup>. The electrochemical response after H<sub>2</sub>O<sub>2</sub> addition was measured as steady current at constant potential versus substrate concentration (Fig.1). After each substrate addition the reduction current rises steeply reaching a constant value. The response is very stable and highly efficient indicating that this system containing Fe-Cu or Fe-Cu-Fe-Cu redox center can mimic the cytochrome c oxidase activity on the electrode<sup>3</sup>.

To confirm this hypothesis, separate experiments replacing electropolymerized Cu-PPIX with Ni-PPIX or Zn-PPIX, and Co-PPIX with Fe-PPIX on the modified electrodes were performed. Negligible currents were obtained after substrate addition in all these cases, proving that the presence of Fe-Cu site is essential for catalytic behavior.

Finally, FIA experiments were performed with this mimetic system in order to explore analytical applications (Fig.2).

### References

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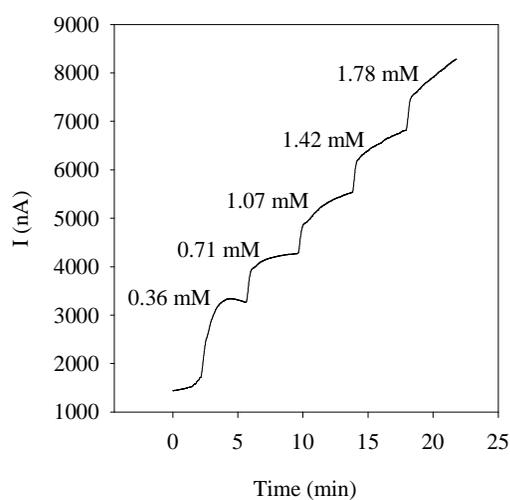


Fig. 1: Steady state response curves for H<sub>2</sub>O<sub>2</sub> additions in 50 mM KPO<sub>4</sub>H<sub>2</sub>; working potential -300 mV vs. Ag/AgCl.

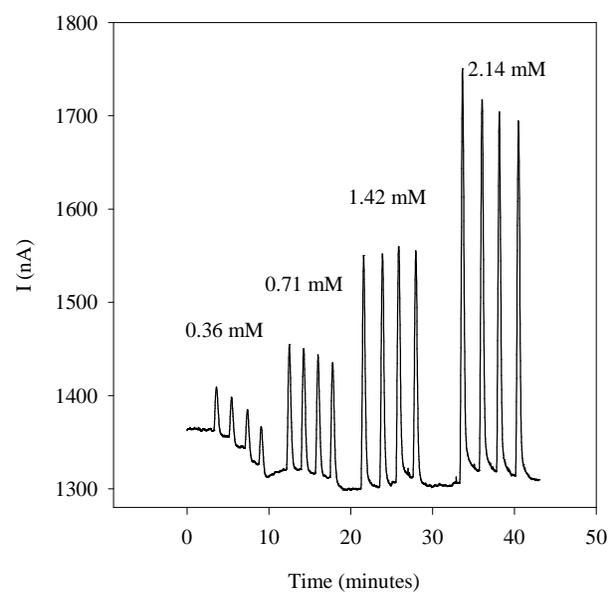


Fig.2: FIA profile for H<sub>2</sub>O<sub>2</sub> successive injections at the modified electrode. Applied potential: -300mV vs Ag/AgCl. Flow rate: 0.3 ml/min