**Supplementary Material**

# Efficient sensing of nitrite by Fe(bpy)$_3$$^{2+}$ immobilized Nafion modified electrodes

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**Amount of $Fe(bpy)_3^{2+}$ exchanged/adsorbed on the GC/Nf electrode:**

The amount of $Fe(bpy)_3^{2+}$ adsorbed on the GC/Nf electrode was calculated by measuring the difference in the absorbance of $Fe(bpy)_3^{2+}$ solution before and after dipping the GC/Nf electrode.

Absorbance of measured volume of $Fe(bpy)_3^{2+}$ solution before the dipping of GC/Nf electrode is measured. Form the absorbance, amount of $Fe(bpy)_3^{2+}$ ($x_1$ mol) present in the solution is calculated according to equation 1 (Reference A).

$$x_1 = (Absorbance/\varepsilon l)*(V/1000) \text{ mol} \quad\quad\quad \dots(1)$$

where '$\varepsilon$' is the molar extinction coefficient ($L.mol^{-1}.cm^{-1}$), '$l$' is the path length (cm) '$V$' is the volume of $Fe(bpy)_3^{2+}$ solution (mL).

Similarly, after dipping the GC/Nf electrode for approximately 30 min. the absorbance of the solution is measured again and the amount of $Fe(bpy)_3^{2+}$ ($x_2$ mole) remaining in the solution is calculated. The difference in amount of $Fe(bpy)_3^{2+}$ (($x_1$-$x_2$) mole) is exchanged/adsorbed on the GC/Nf electrode. As one molecule of $Fe(bpy)_3^{2+}$ will exchange two protons from two $-SO_3H$ groups, one mol of $Fe(bpy)_3^{2+}$ is considered as two equivalents.

Reference A:

D. A. Skoog, E. J. Holler and T. A. Nieman, Principles of Instrumental Analysis, Fifth editon (1998), Saunders College Publishing, Philadelphia, USA.
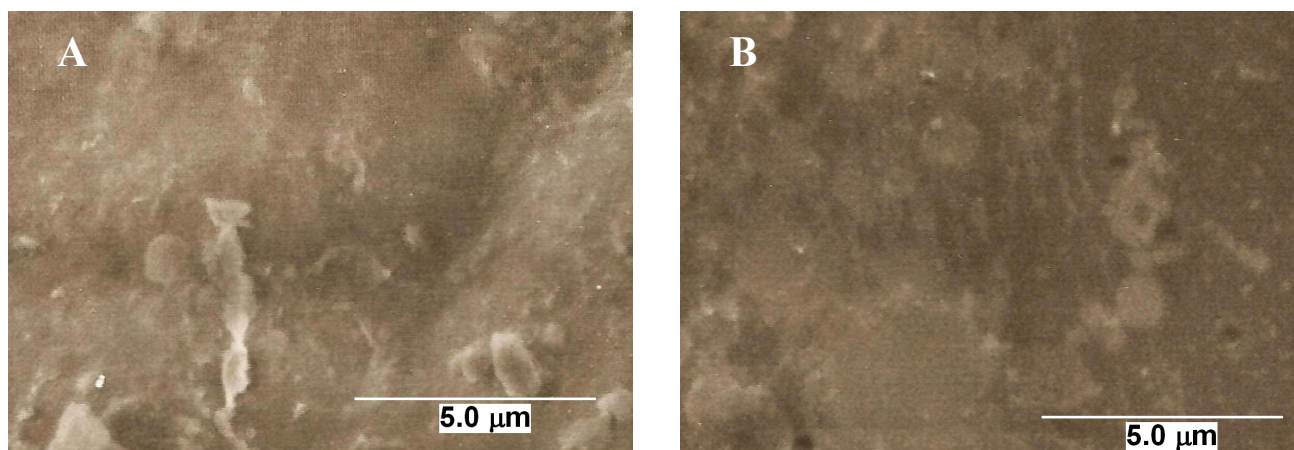
**Fig. S1.** SEM images of GC/Nf (A) and GC/Nf/Fe(bpy)$_3$$^{2+}$ (B) films coated on a glass plate.
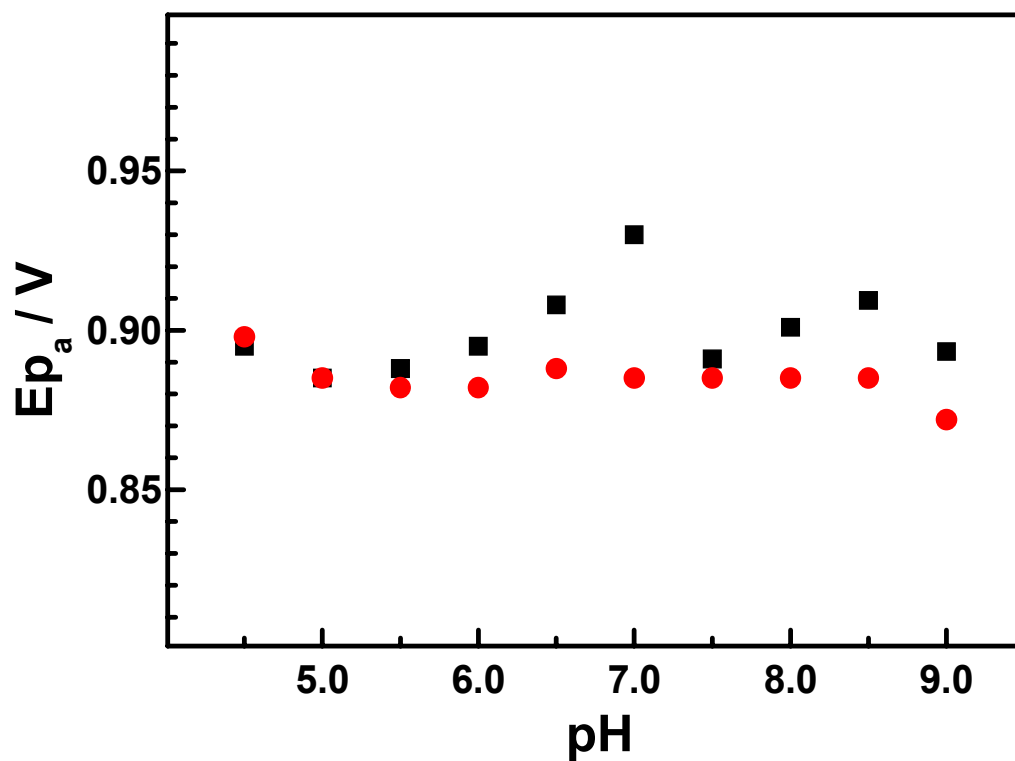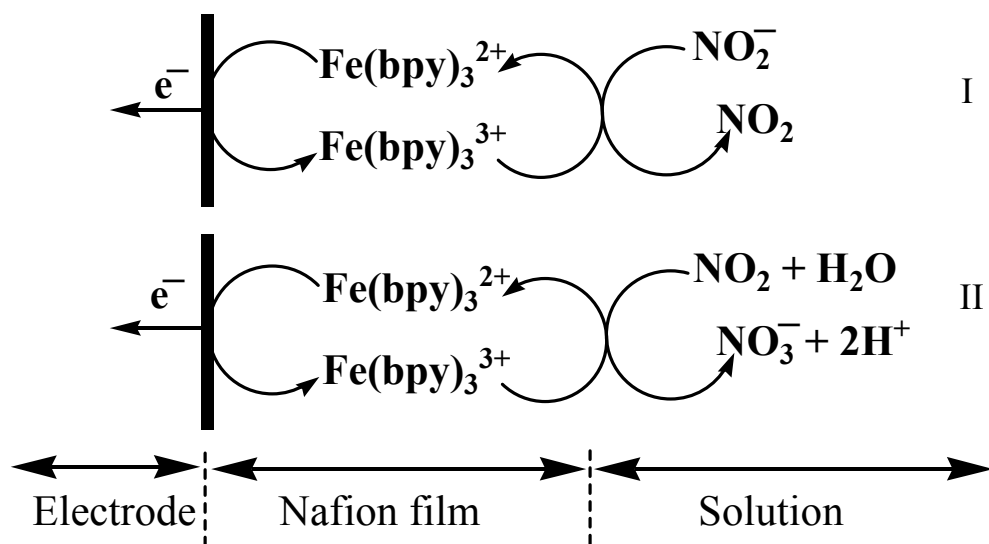
**Fig. S2**. Effect of pH on the oxidation peak potentials (Ep$_a$) of Fe(bpy)$_3^{2+}$ (●) and nitrite

(■) at the GC/Nf/ Fe(bpy)$_3^{2+}$ electrodes. Note: '●' are obtained in the absence of nitrite.

'■' are obtained in the presence of 5.0 mM nitrite.

I

II

Electrode | Nafion film | Solution

**Scheme S1.** Schematic representation of electrocatalytic oxidation of $NO_2^-$ at the GC/Nf/Fe(bpy)$_3^{2+}$ electrodes.

**Table S1.** Influence of interferences on the oxidation peak current of 1.0 mM $NO_2^-$ at GC/Nf/Fe(bpy)$_3^{2+}$ electrodes.

| Interference | Signal change % |
|---|---|
| $Cl^-$ | + 5.7 |
| $NO_3^-$ | + 3.8 |
| $HCO_3^-$ | - 3.6 |
| $CH_3CO_2^-$ | - 1.2 |
| $Cu^{2+}$ | - 1.1 |
| $K^+$ | + 3.2 |
| $O_2$ | + 0.6 |
| Glucose | + 1.2 |
| Urea | + 5.5 |

**Table S2.** Recovery analysis for nitrite oxidation at GC/Nf/Fe(bpy)$_3^{2+}$ electrodes.

| Sample | Nitrite added (mM) | Nitrite found (mM) | Recovery (%) | Relative standard deviation (%) |
|---|---|---|---|---|
| Tap water | 1.0 | 0.94 | 94 | 1.5 (n = 5) |
| Packaged drinking water (a popular brand) | 1.0 | 0.96 | 96 | 0.9 (n = 6) |