Supporting Information

Electrochemical Sensor for Ascorbic Acid, Acetaminophen and Nitrite Based on Organoclay/Zr-MOF Film Modified Glassy Carbon Electrode

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Supporting information

Abstract

A composite (Sa-HTDMA/UiO-66) consisting of organoclay (Sa-HTDMA) and a metal-organic framework (UiO-66) was prepared using organically modified natural Cameroonian clay and Zr-MOF. The organoclay was obtained by intercalating in its interlayer a positively charged surfactant. The composite was then used to form a film onto a glassy carbon electrode (GCE) by drop coating (Sa-HTDMA/UiO-66/GCE). Electrochemical responses recorded at the as-prepared modified electrodes for ascorbic acid, acetaminophen and nitrite were investigated using cyclic and linear sweep voltammetry. The results revealed that Sa-HTDMA/UiO-66/GCE exhibited a favorable behavior for individual and simultaneous sensing of AA, AC and NO_2^-. Additionally, compared with UiO-66 modified GCE, the composite enabled good performance of the electrode. Under the optimum conditions, the linear calibration curves were attained in the following ranges: 1- 650 µM for AA, 1-700 µM for AC and 1-600 µM for nitrite with the respective detection limits of 0.01, 0.19 and 0.33µM. Application of the sensors to determine AA and AC in pharmaceutical preparations, and NO_2^- in tap water, was successful.

Keywords: Composite; Electroanalysis; Modified electrode; Organoclay; Zr-MOF

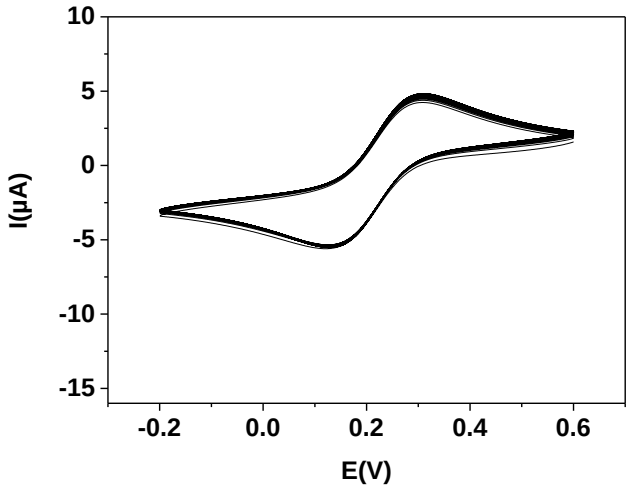

Fig S1. Multisweep cyclic voltammograms recorded for 5 mM $[Fe(CN)6]^{3-}$using the UiO-66 film prepared using 7 mg/mL of the composite. The curves were obtained in 0.1 M KCl, at a scan rate of 50 mV s^{-1}

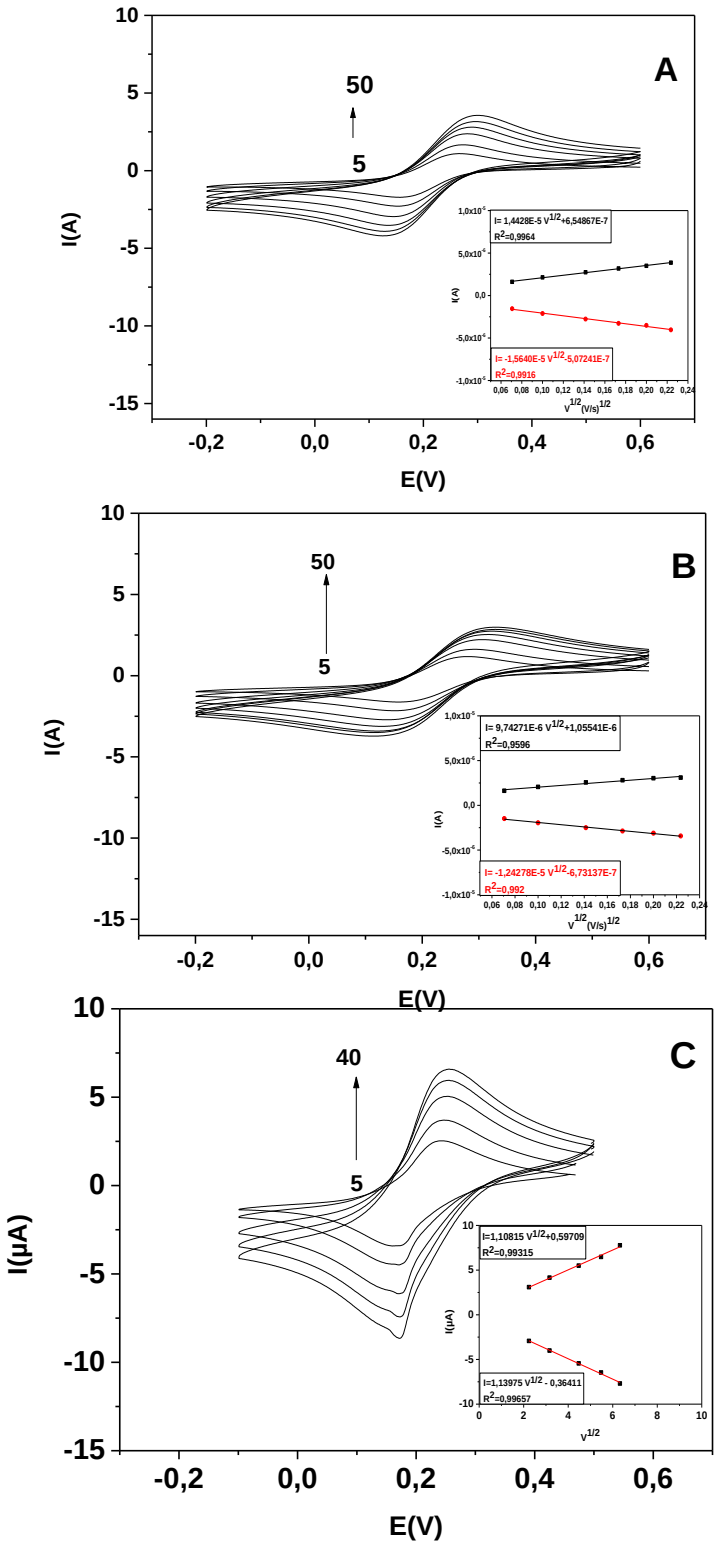

Fig S2. Cyclic voltammograms at (A) bare GCE, (B) the UiO-66/GCE and(C) Sa-HTDMA /UiO-66/GCE in 0.01 M AB (pH 5) containing 620 µM AA, 671 µM AC and 620 µM NO_2^- at different scan rates. Insets show plot of peak currents vs. the square root of scan rate.

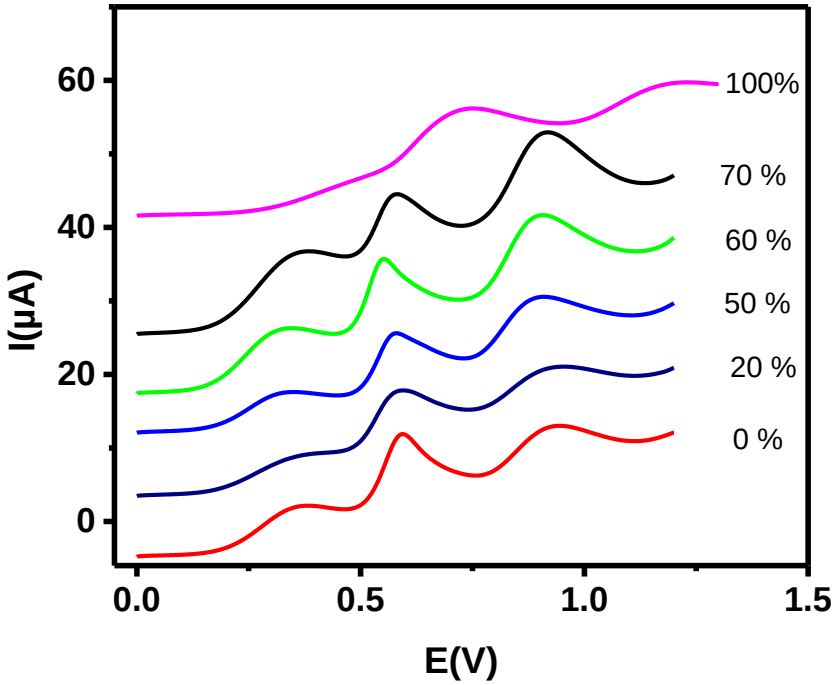

Fig. S3. Effect of various amounts of zirconium/MOF in the (Sa-HTDMA /UiO-66) composite film modified GCE on currents peak of AA, AC and NO_2^-. LSV recorded in 0.01 M AB buffer (pH 5.0) containing 620 µM AA, 671 µMAC and 620 µM NO_2^-

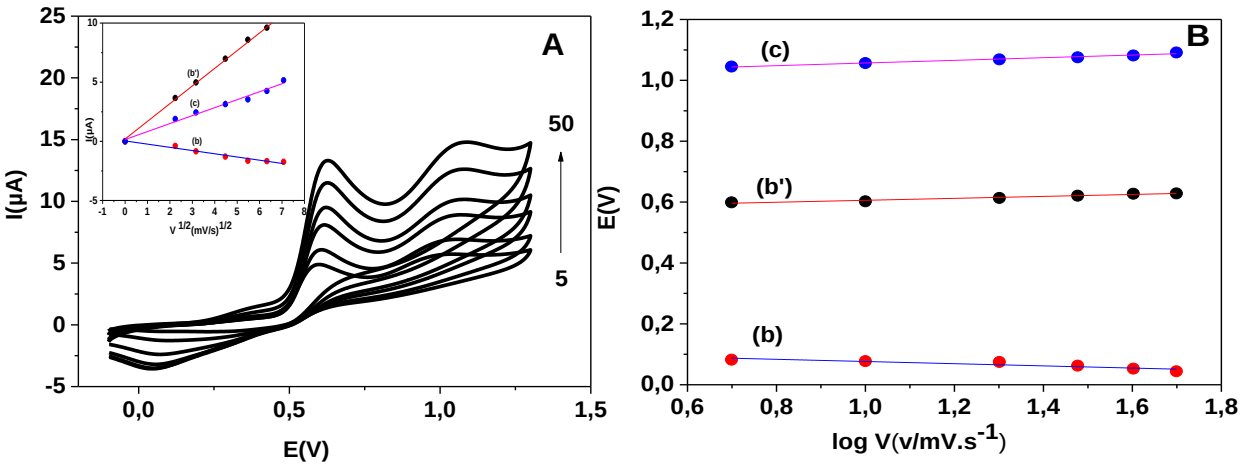

Fig. S4: (A) Cyclic voltammograms at UiO-66 /GCE in 0.01 M AB (pH 5) containing 620 µM AA, 671 µM AC and 620 µM NO_2^- at different scan rates. Inset shows plot of peak currents of (b' and b) AC and (c) NO_2^- vs. the square root of scan rate. (**B**) Plot of Ep versus log *v* for (b' and b) AC and (c) NO_2^-.

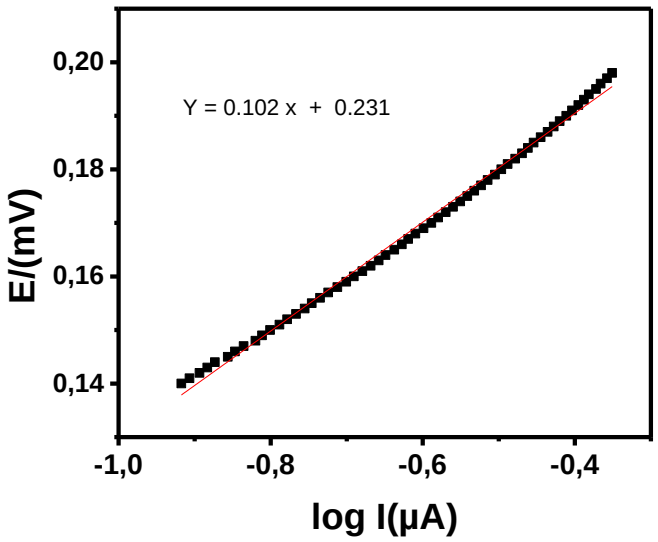

Fig. S5: Plot of Ep versus log I for current voltage curve of CV recorded at 5 $mV.s^{-1}$ recorded at Sa-HTDMA/UiO-66/GCE

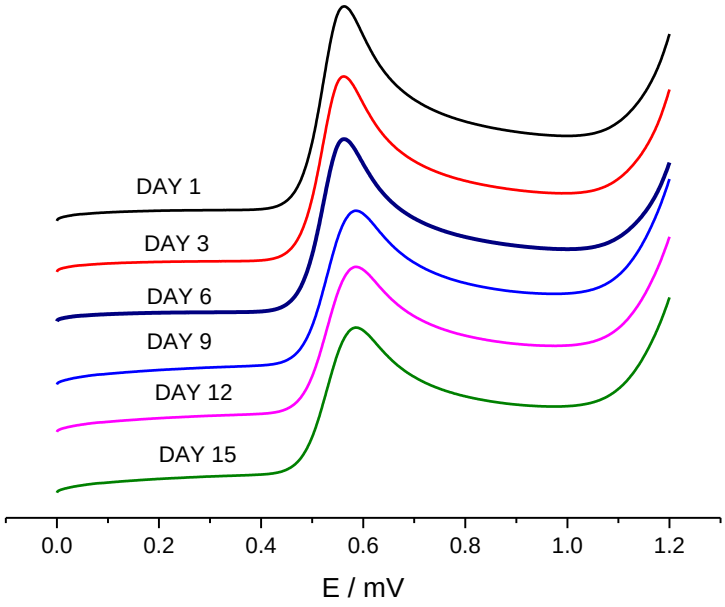

Fig. S6. Electrochemical response recorded in 0.01 M pH 5.0 AB containing sample fix concentration of AC at the same Sa-HTDMA/UiO-66/GCE (stored in PB when not in used) on different days.

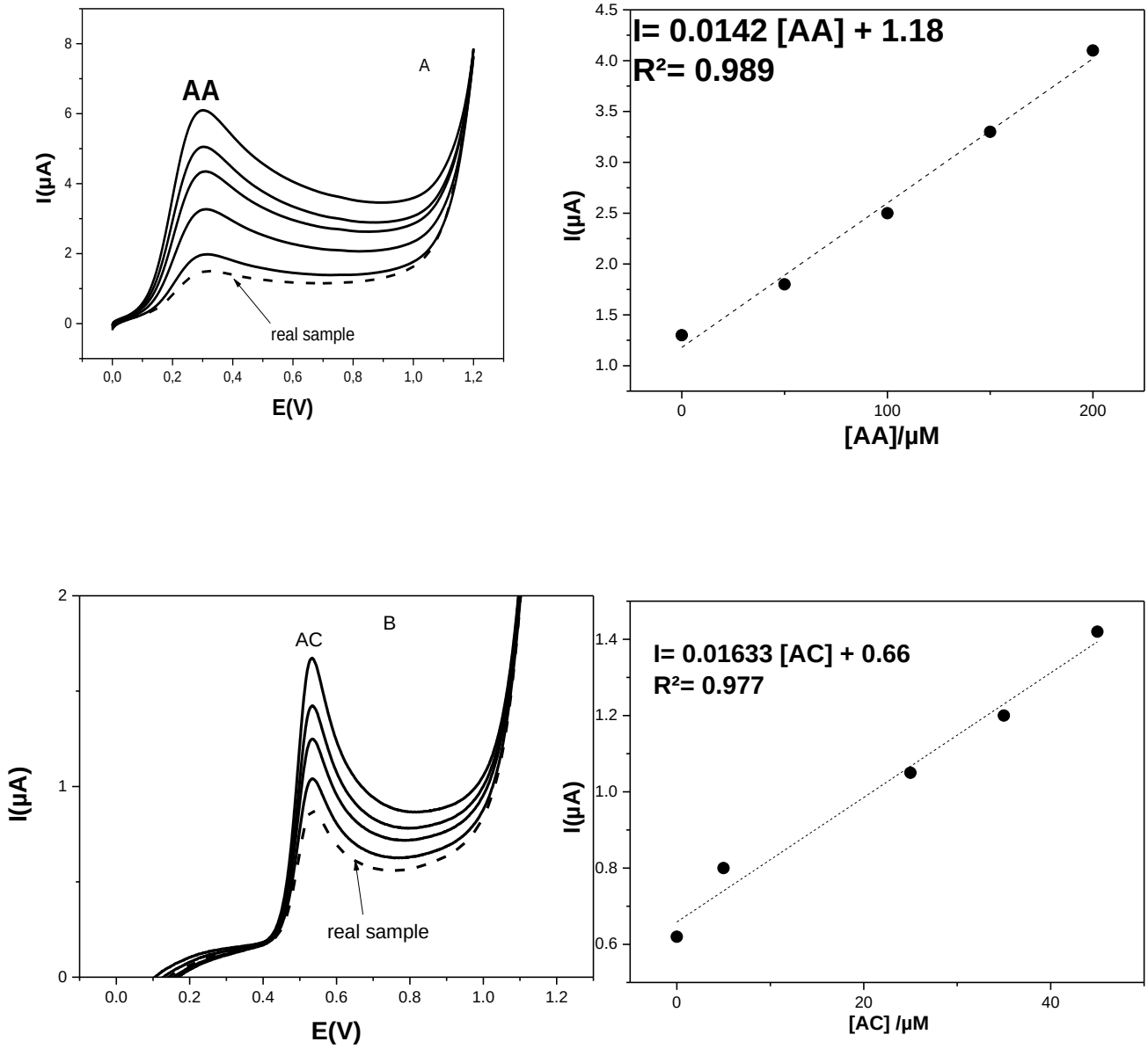

Fig S7. Linear sweep voltammograms recorded in 0.01 M pH 5.0 AB containing sample (dashed line) at Sa-HTDMA /UiO-66 /GCE with successive addition of: (A) AA and (B) AC standard. The insets show the corresponding calibration curve

Table 1S: Determination of NO_2^- levels in tap water using the Sa-HTDMA /UiO-66 /GCE

Added (µM)	**Found (**µM)	**% Recovery**
50	49.15	98.30
80	85.98	107.48
150	152	101.33a