

Supporting Information

DNA mediated electrocatalytic enhancement on α -Fe₂O₃-PEDOT-C-MoS₂ hybrid nanostructures for Riboflavin detection on Screen Printed Electrode

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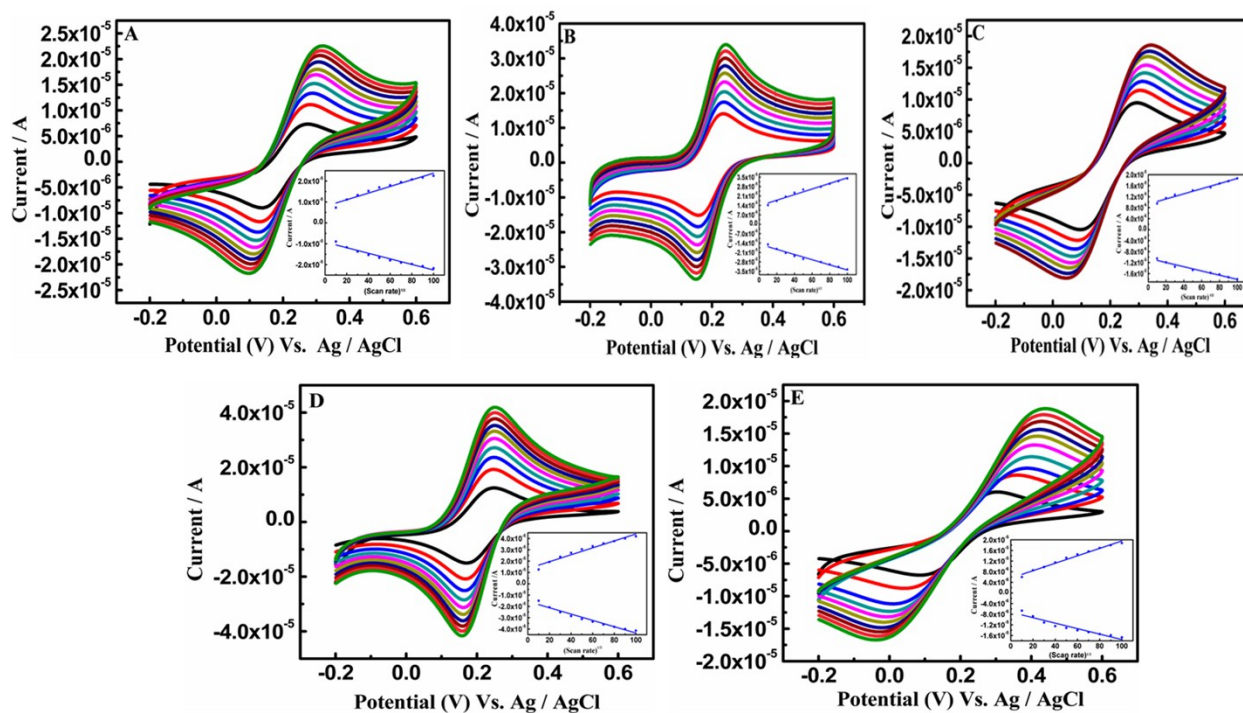


Fig. S1 CV Profiles (A) α -Fe₂O₃ (B) C-MoS₂ (C) PEDOT (D) α -Fe₂O₃-PEDOT- C-MoS₂ (E) α -Fe₂O₃-PEDOT- C-MoS₂-DNA hybrid at 50 mVs⁻¹ for different scan rate 10-100 mVs⁻¹ in 0.1 M of KCl and 1mM of [Fe (CN)₆]³⁻⁴

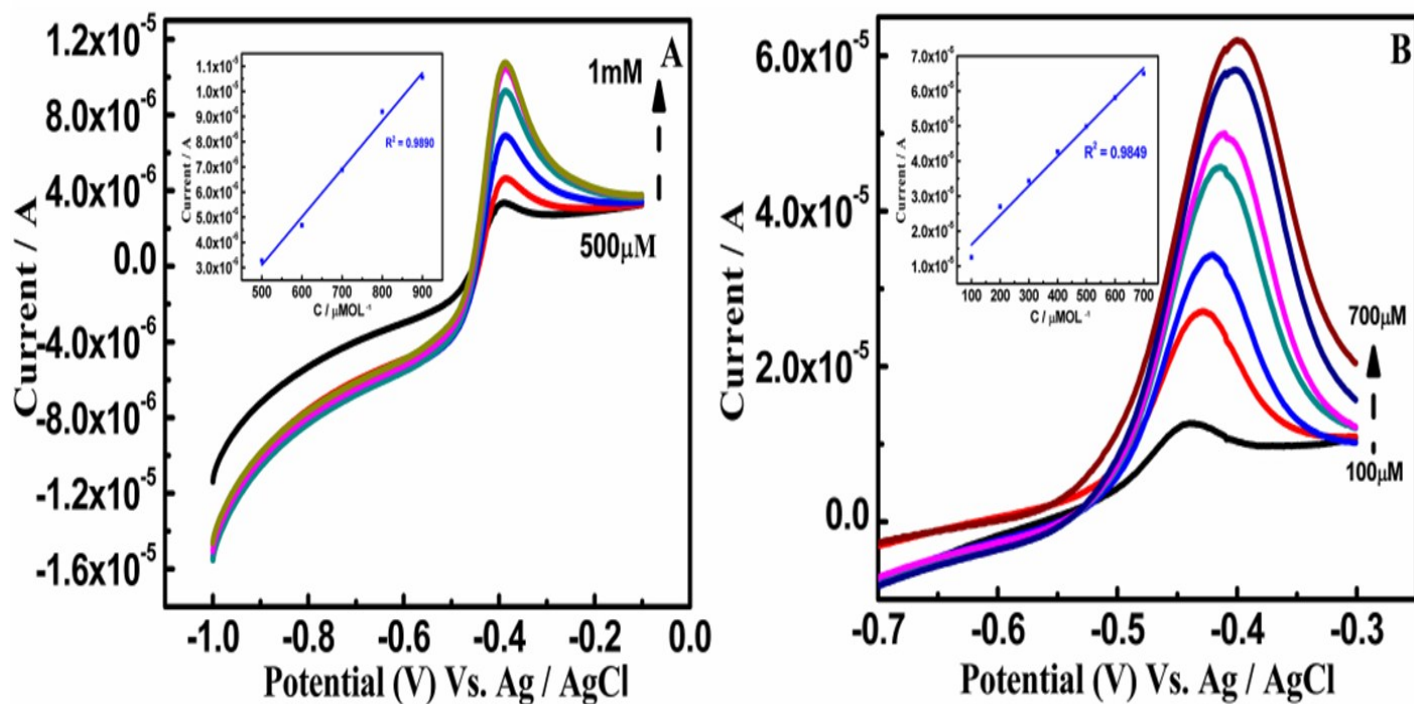


Fig. S2 LSV Curves (A) α -Fe₂O₃-PEDOT-C-MoS₂-DNA hybrid nanostructure (B) α -Fe₂O₃-PEDOT- C-MoS₂ composite .

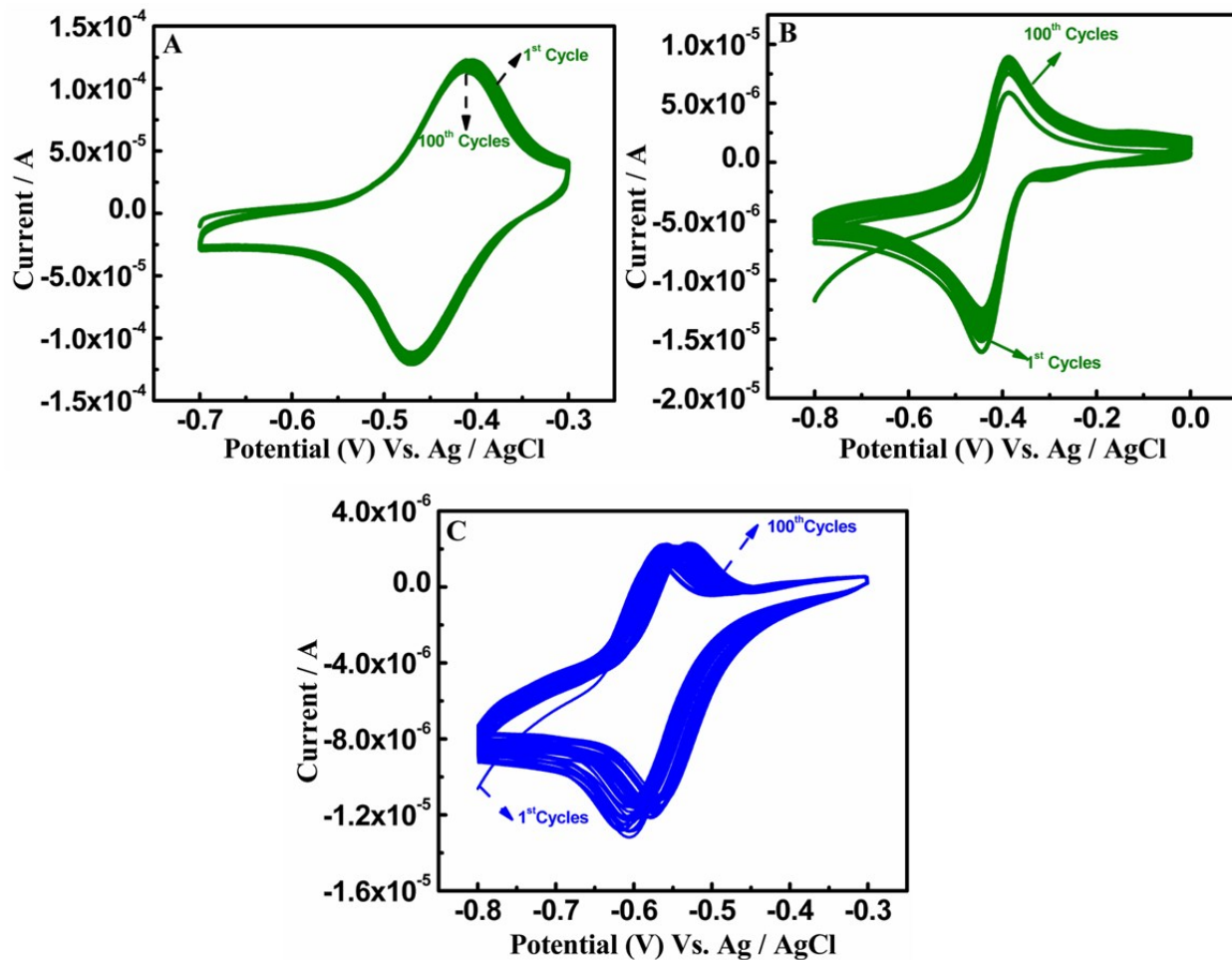


Fig.S3 (A) α -Fe₂O₃-PEDOT- C-MoS₂ composite/GCE (B) α -Fe₂O₃-PEDOT-C-MoS₂-DNA/GCE hybrid nanostructure (C) α -Fe₂O₃-PEDOT- C-MoS₂-DNA/SPE hybrid nanostructure 100 cycles at 50 mVs⁻¹ in presence of 1mM of RF concentration

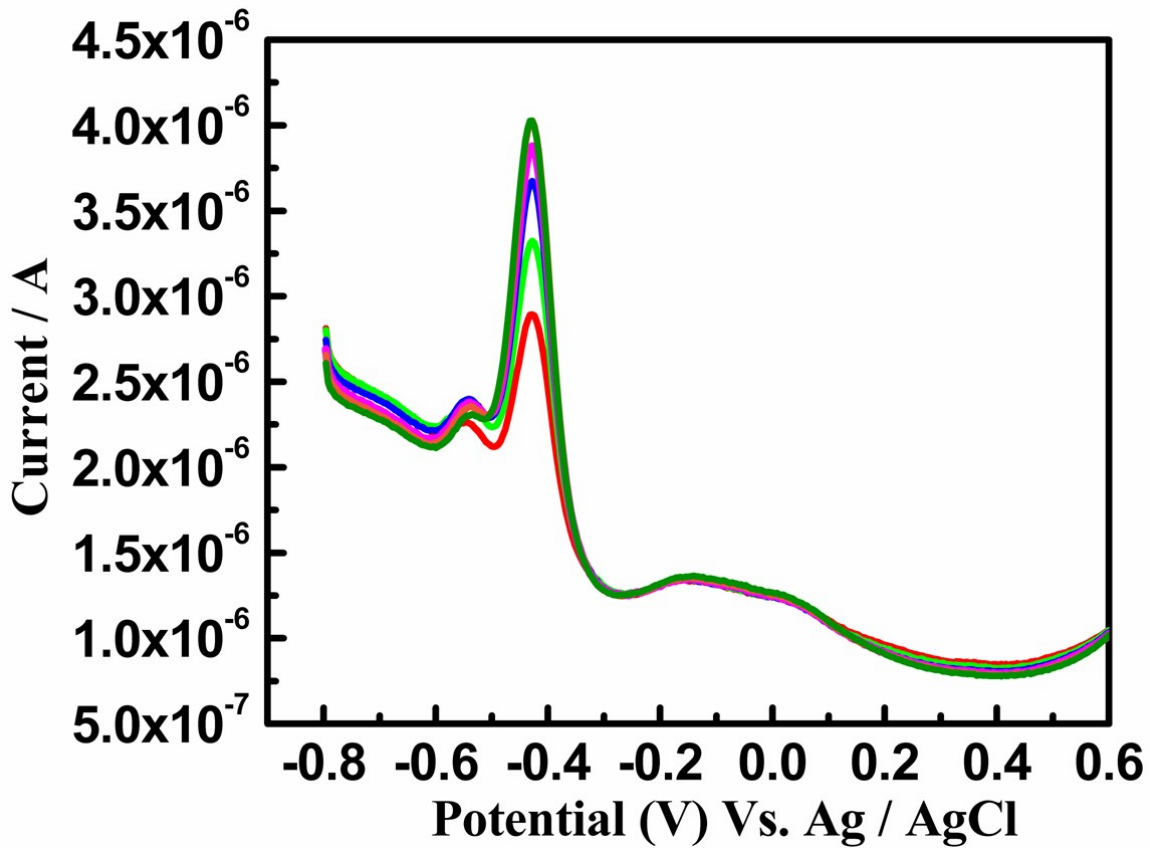


Fig. S4. SWV curves of α -Fe₂O₃-PEDOT- C-MoS₂-DNA/GCE hybrid nanostructure for RF of 50 μ M concentration while other interfering analytes at higher concentration

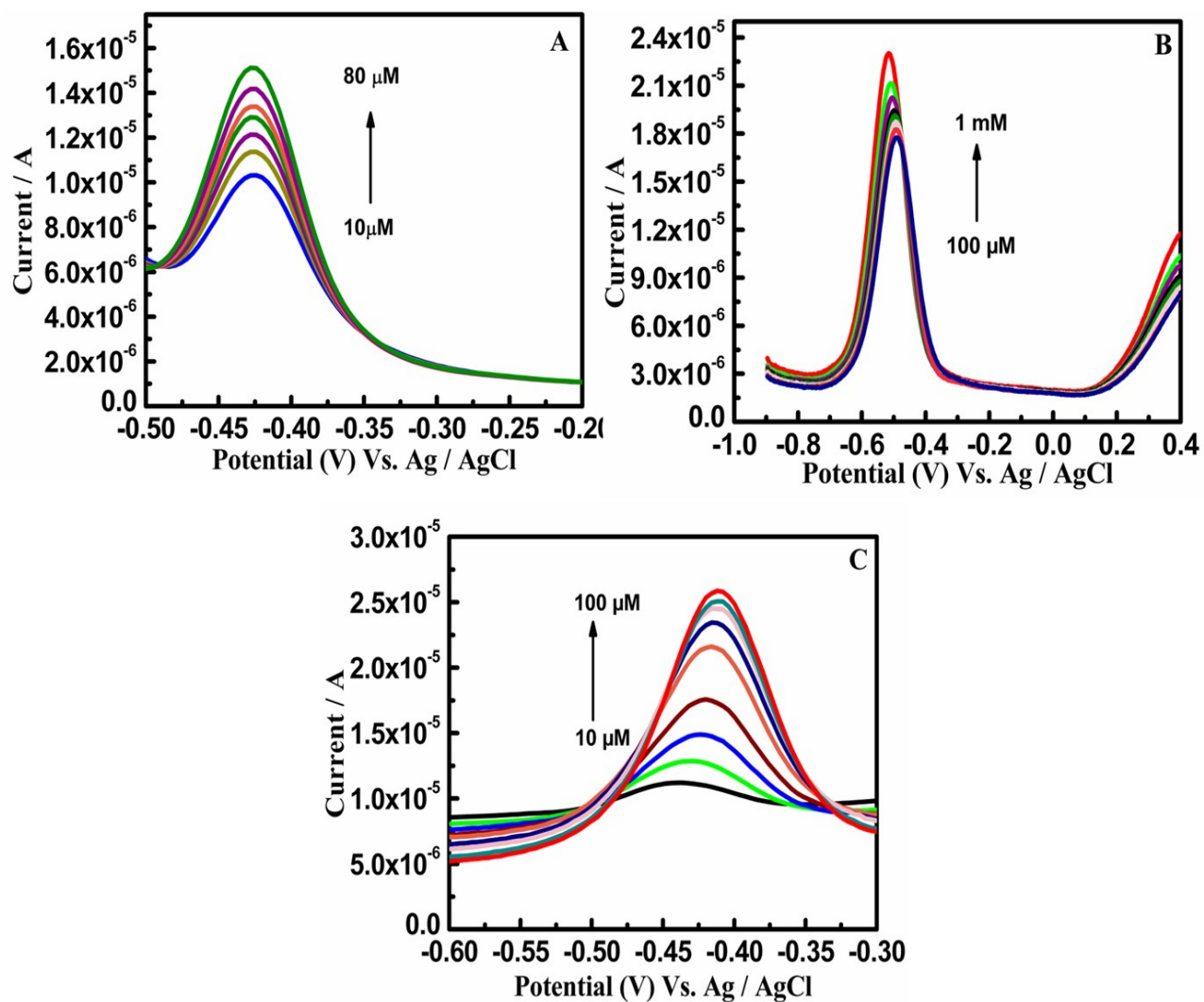


Fig. S5. SWV response of $\alpha\text{-Fe}_2\text{O}_3\text{-PEDOT-C-MoS}_2\text{-DNA/GCE}$ at different concentration (A) human urine (B) milk powder (C) tablets in 0.1 M PBS containing pH 7.0 .

Table S1 Effect of interference on RF determination for the α -Fe₂O₃-PEDOT- C-MoS₂-DNA hybrid modified electrode

Interfering species	Interferents concentration (μM)	Concentration ratio (Riboflavin: Interferents)	Recovery (%)
Folic acid	10	1:10	94
Uric acid	10	1:10	91
Ascorbic acid	10	1:10	90
L-dopa	10	1:10	96
Serotonin	10	1:10	94
Epineprine	10	1:10	95
Cystamine	10	1:10	94
Dopamine	10	1:10	104
Tyrosine	10	1:10	105
Fe	100	1:100	94
Mg	100	1:100	107
Ca	100	1:100	95
K	100	1:100	96
NO ₃	100	1:100	91
NH ₄	100	1:100	93
Cl	100	1:100	93

Table S2 Determination of the RF content in commercial pharmaceutical products by SWV on the α -Fe₂O₃-PEDOT- C-MoS₂-DNA hybrid modified electrode.

Sample	Reported content (mg)	Content found (mg)	Recovery %
1. multivitamin tablet	10	9.1	91
2. multivitamin capsule	2	1.8	90
3. Milk powder	1	0.85	91.7

Table S3 Results for determination of RF in urine sample

Sample	Analyte	Added (μM)	Found (μM)	Recovery
urine	RF	50	48	96
		100	102	102
		150	141	94
		200	193	96.5

Table S4

Comparison of the efficiency of reported electrochemical methods in the determination of RF

Electrode	limit of detection (M)	linear range (M)	reference
PEDOT/CIO ₄ ⁻ /GCE	0.08 × 10 ⁻⁶	0.15–300 × 10 ⁻⁶	[1]
PEDOT/Fc ⁻ /GCE	0.05 × 10 ⁻⁶	0.1–300 × 10 ⁻⁶	[1]
PEDOT/Fe(CN) ₆ ⁻⁴ /GCE	0.02 × 10 ⁻⁶	0.04–200 × 10 ⁻⁶	[1]
Aza / PCPE	5.3 × 10 ⁻¹⁰	1.33 × 10 ⁻⁹ – 1.86 × 10 ⁻⁴	[2]
P3MT/GCE	5.0 × 10 ⁻⁸	1.0 × 10 ⁻⁷ – 2.0 × 10 ⁻⁴	[3]
CILE	1.0 × 10 ⁻¹⁰	8.0 × 10 ⁻¹⁰ – 1.1 × 10 ⁻⁷	[4]
Ag amalgam film	2.4 × 10 ⁻⁸	1.33 × 10 ⁻⁷ – 8.0 × 10 ⁻⁶	[5]
Ds-DNA/ PCE	9.0 × 10 ⁻⁷	1.33×10 ⁻⁶ – 1.86 × 10 ⁻⁴	[6]
AgSAEs	8.2 × 10 ⁻¹⁰ (m – AgSAE) and 1.3 × 10 ⁻⁹ (p-AgSAE)	-	[7]
DNA/CNT	5.31 × 10 ⁻¹³	-	[8]
WO ₃ – TiO ₂	1.87 × 10 ⁻⁷	3.23 × 10 ⁻⁷ - 4.0 × 10 ⁻⁵	[9]
Cr- SnO ₂	1.07 × 10 ⁻⁷	0.2 × 10 ⁻⁶ - 1.0 × 10 ⁻⁴	[10]

References for Table S4

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