Supplementary Data

Efficient Preparation of a Non-enzymatic Nanoassembly based on Cobalt substituted Polyoxometalates (Co-POM) and Polyethylene imine (PEI) capped Silver Nanoparticles (AgNPs) for the Electrochemical Sensing of Carbofuran

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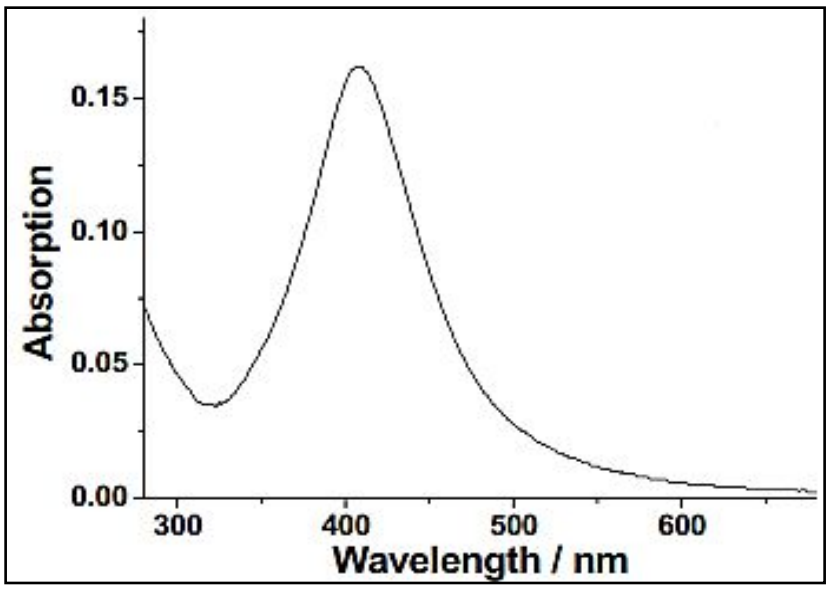

Figure S1: Typical UV-Visible spectrum of silver nanoparticles.

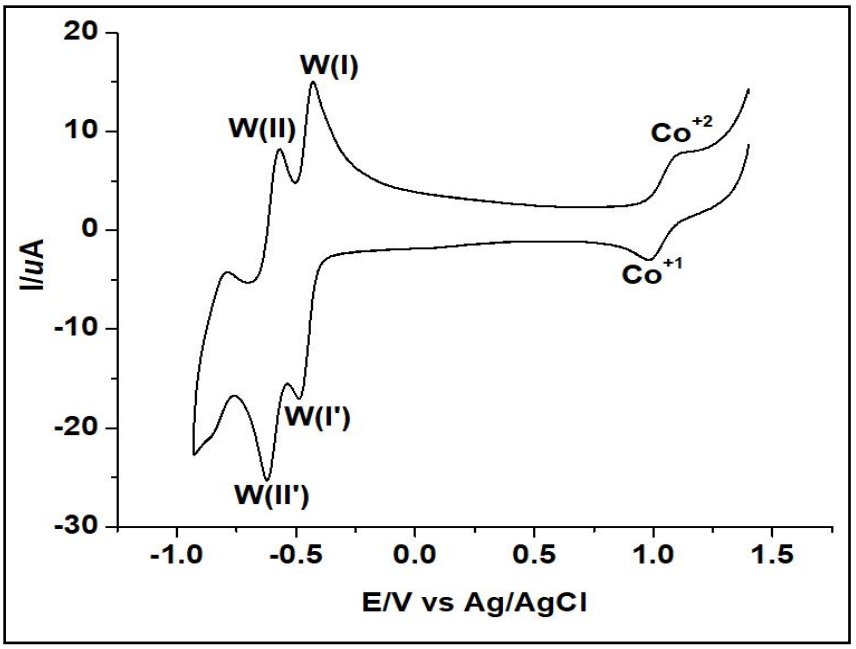

Figure S2: Solution phase cyclic voltammetry of cobalt substituted Dawson type polyoxometalate i.e. $K_8P_2W_{17}O_{61}(Co^{2+}OH_2).16H_2O$ in pH 4.5 buffer vs. Ag/AgCl (reference), Scan rate was 100 mVs^{-1} at negative scan direction.

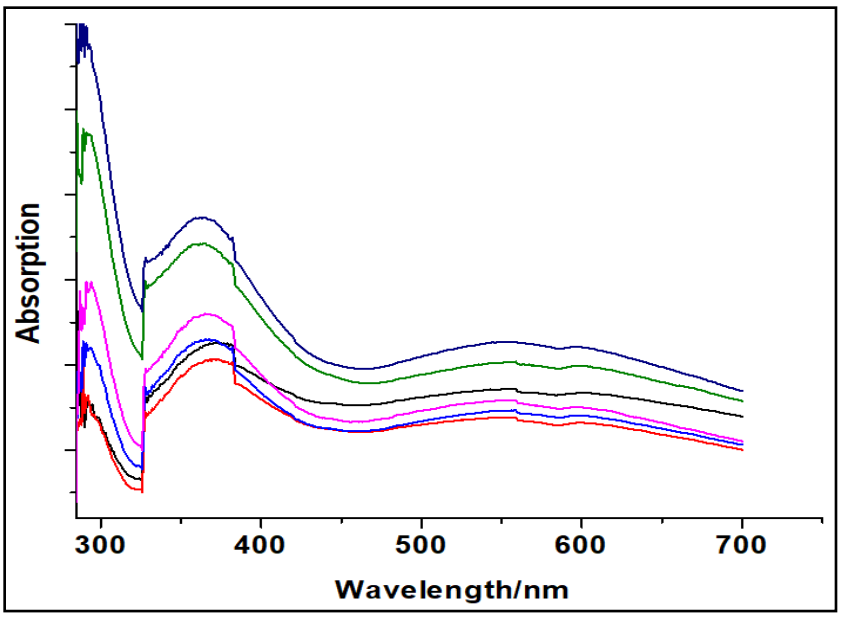

Figure S3: UV-Vis spectra of multilayer assembly based on PDDA/(POM/AgNPs)n composition having n=6 fabricated on ITO slide. The blank slide was used as a reference.

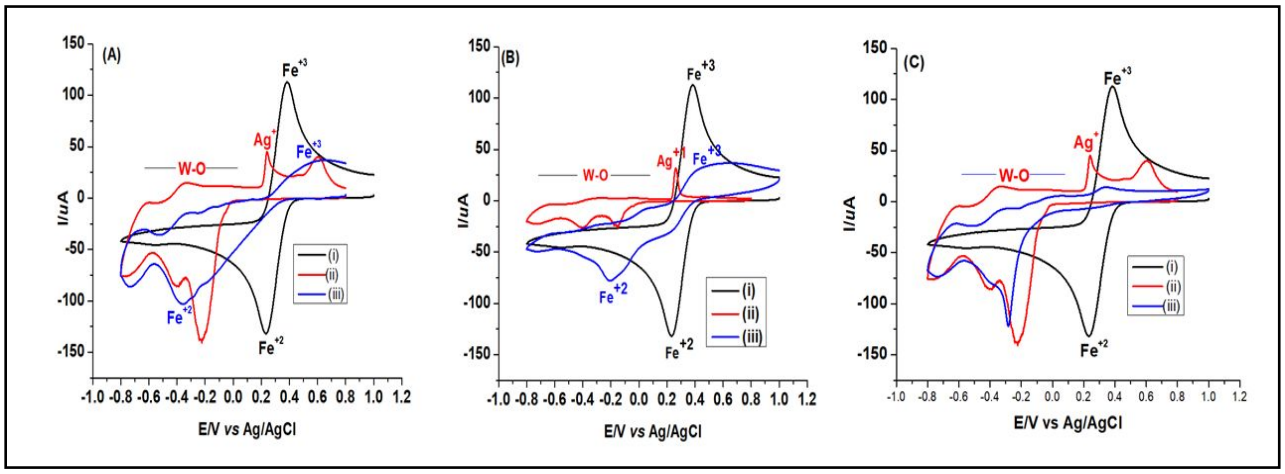

Figure S4: Permeability study: (A) Cyclic voltammograms recorded for (i) 1 mM $[Fe(CN)_6]^{3-}$ in buffer (0.1 M Na_2SO_4/pH 2.0) at clean GCE before any deposition, (ii) Co-POM/AgNP multilayer nanoassembly comprising of 4 bilayers with outermost POM layer (anionic) in the same buffer, (iii) Co-POM/AgNP hybrid film in 1 mM $[Fe(CN)_6]^{3-}$ in pH 2.0 buffer. (B) Overlay of cyclic voltammograms of (i) 1 mM $[Fe(CN)_6]^{3-}$ in buffer (0.1 M Na_2SO_4/pH 2.0) at clean GCE, (ii) Co-POM/AgNP multilayer film of 4 bilayers with outermost layer of cationic nanoparticles in the same buffer solution, (iii) Co-POM/AgNP hybrid film in of 1 mM $[Fe(CN)_6]^{3-}$ in pH 2.0 buffer. (C) Overlay of cyclic voltammograms of (i) 1 mM $[Fe(CN)_6]^{3-}$ in pH 2.0 buffer on clean GCE, (ii) Co-POM/AgNP hybrid film comprising 8 bilayers with outermost layer of anionic POM in pH 2.0 buffer, (iii) hybrid film in 1 mM $[Fe(CN)_6]^{3-}$ in pH 2.0 buffer (Scan rate was 100 mVs^{-1}).

Table S1: Comparison of average recovery values of carbamate pesticide in real samples with the previously reported methods.

Method	Sample	Analysis time (min)	Concentrations (μg/kg)	Recoveries (%)	References
Micellar electrokinetic chromatography tandem mass spectrometry	Tomatoes	>120	10	81-99	1
HPLC	Tomatoes	>180	10	-	2
AChE/Con A/PDA-RGO-GNP/GCE	Tomatoes	15-20	10	101	3
HPLC-MS/MS	Tomatoes	8	-	Avg.63	4
HPLC/DAD	Tomatoes	10	30	84.5-88.1	5
icELISA	Mango	>30	10	83.3	6
UPLC-MS/MS	Mango	>10	10	84.7	6
LC/DAD	Tomatoes	10	60	65.8	7
PDDA/Co-POM/AGNP/GCE	Tomatoes	<2	10	102	This work

References:

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