

Supplementary information for
**A comparative study of carbon-platinum hybrid nanostructure architecture for
amperometric biosensing**

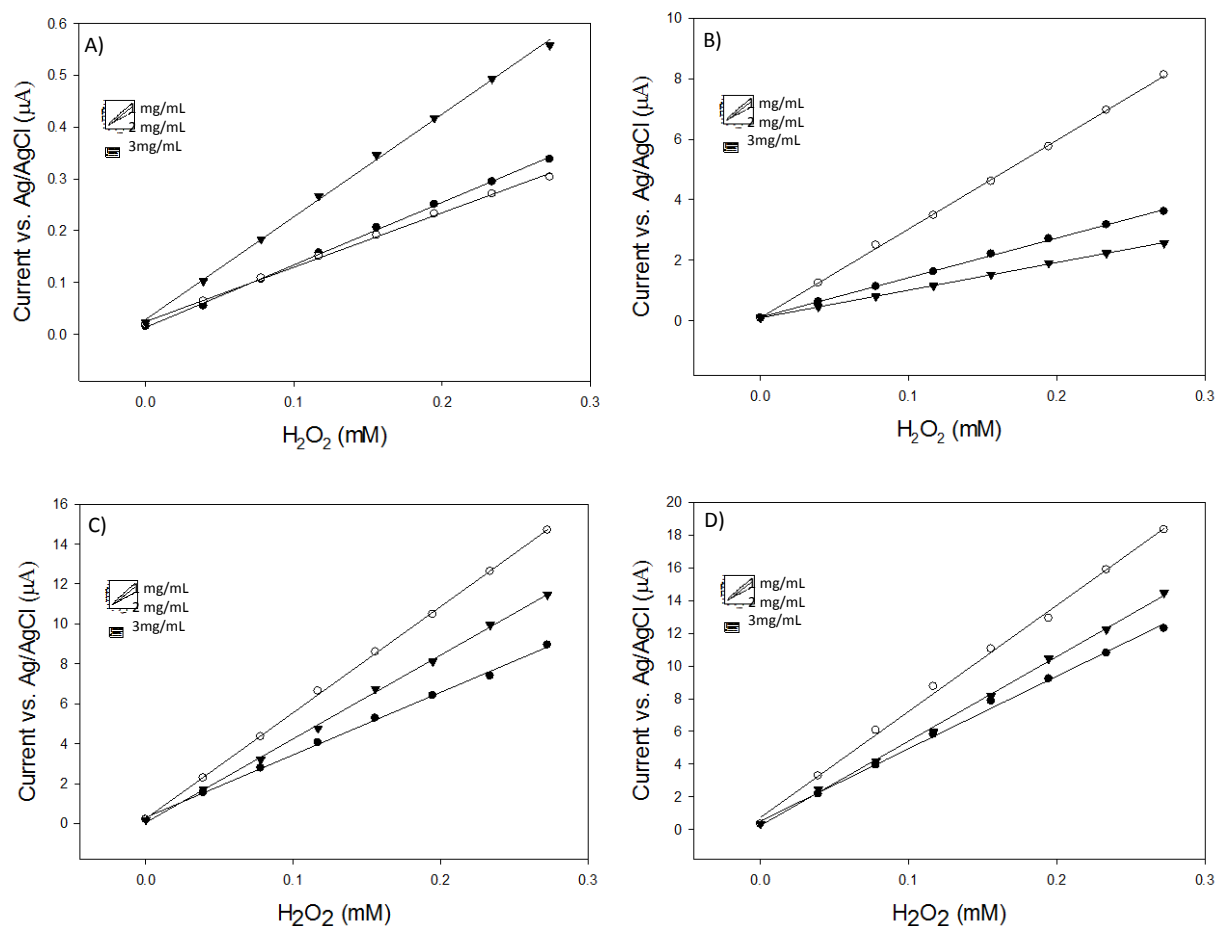
D.C. Vanegas, M. Taguchi, P. Chaturvedi, S. Burrs, M. Tan, H. Yamaguchi, E.S. McLamore*

*To whom correspondence should be addressed. E-mail: emclamor@ufl.edu; Tel: +1 352 392 1864

This file includes:

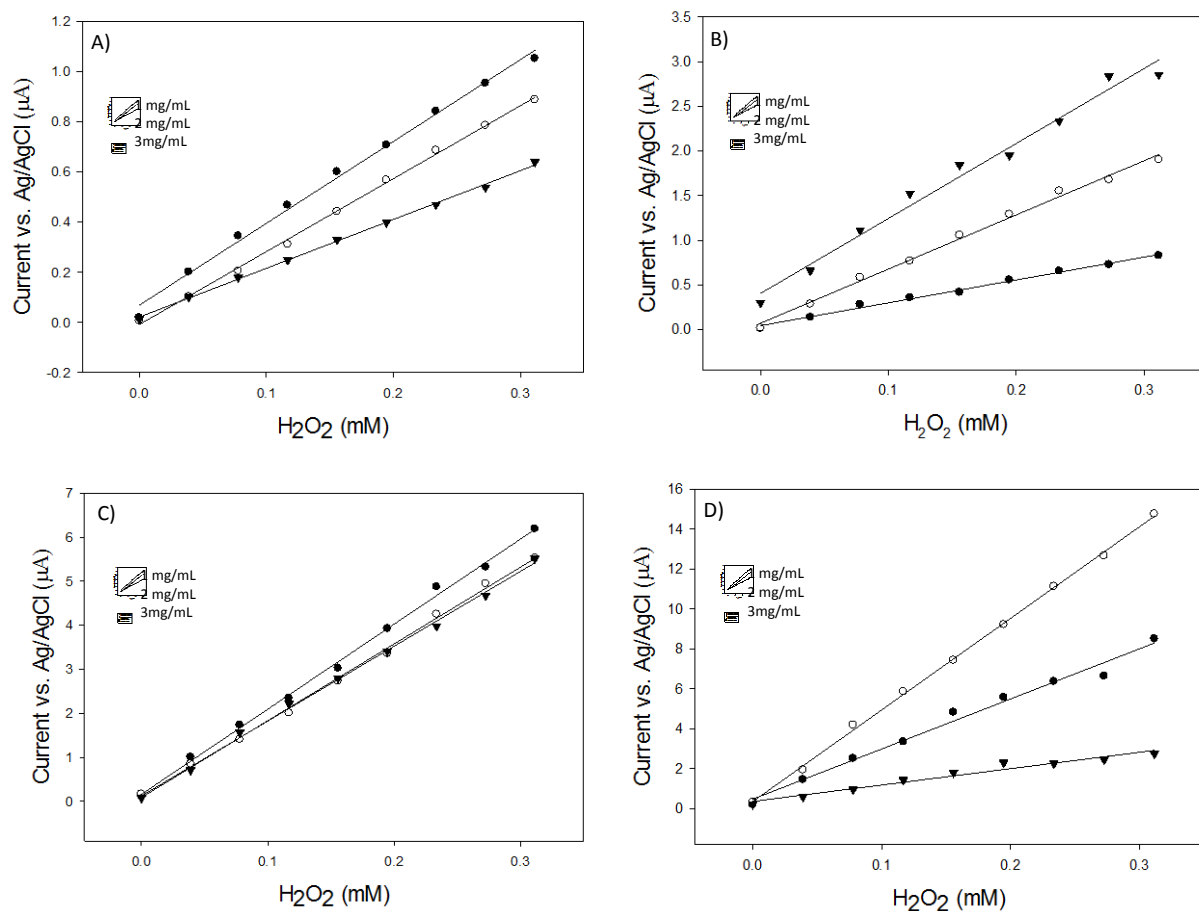
Supplemental Figures 1-4

Supplemental Tables 1-3



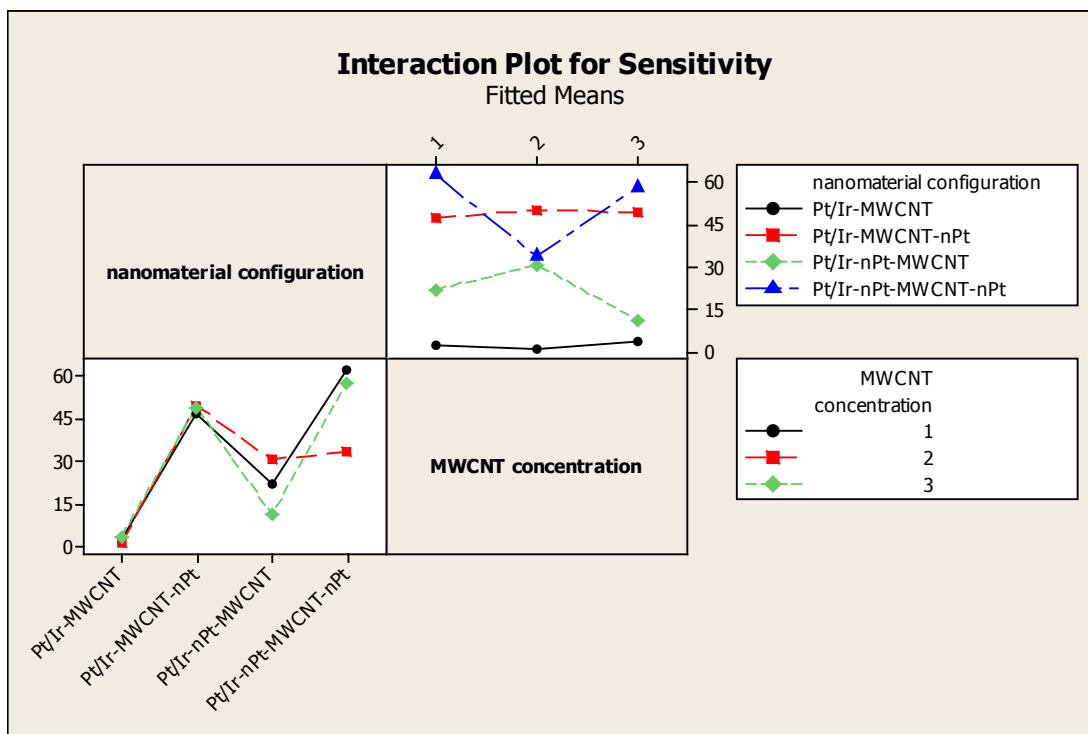
Supplemental Figure 1. Representative calibration curves of the CNT-based nanomaterial platforms. Each curve corresponds to one replicate in every treatment of the experimental design.

A) Representative calibration curves of the Pt/Ir-MWCNT platforms at 3 different carbon concentrations. B) Representative calibration curves of the Pt/Ir-nPt-MWCNT platforms at 3 different carbon concentrations. C) Representative calibration curves of the Pt/Ir-MWCNT-nPt platforms at 3 different carbon concentrations. D) Representative calibration curves of the Pt/Ir-nPt-MWCNT-nPt platforms at 3 different carbon concentrations.



Supplemental Figure 2. Representative calibration curves of the GO-based nanomaterial platforms. Each curve corresponds to one replicate in every treatment of the experimental design.

A) Representative calibration curves of the Pt/Ir-GO platforms at 3 different carbon concentrations. B) Representative calibration curves of the Pt/Ir-nPt-GO platforms at 3 different carbon concentrations. C) Representative calibration curves of the Pt/Ir-RGO-nPt platforms at 3 different carbon concentrations. D) Representative calibration curves of the Pt/Ir-nPt-RGO-nPt platforms at 3 different carbon concentrations.



Supplemental Figure 3. Interaction plot showing non-combined effect of both factors (configuration/cnt concentration) on the electrochemical sensitivity of the MWCNT-modified electrodes.

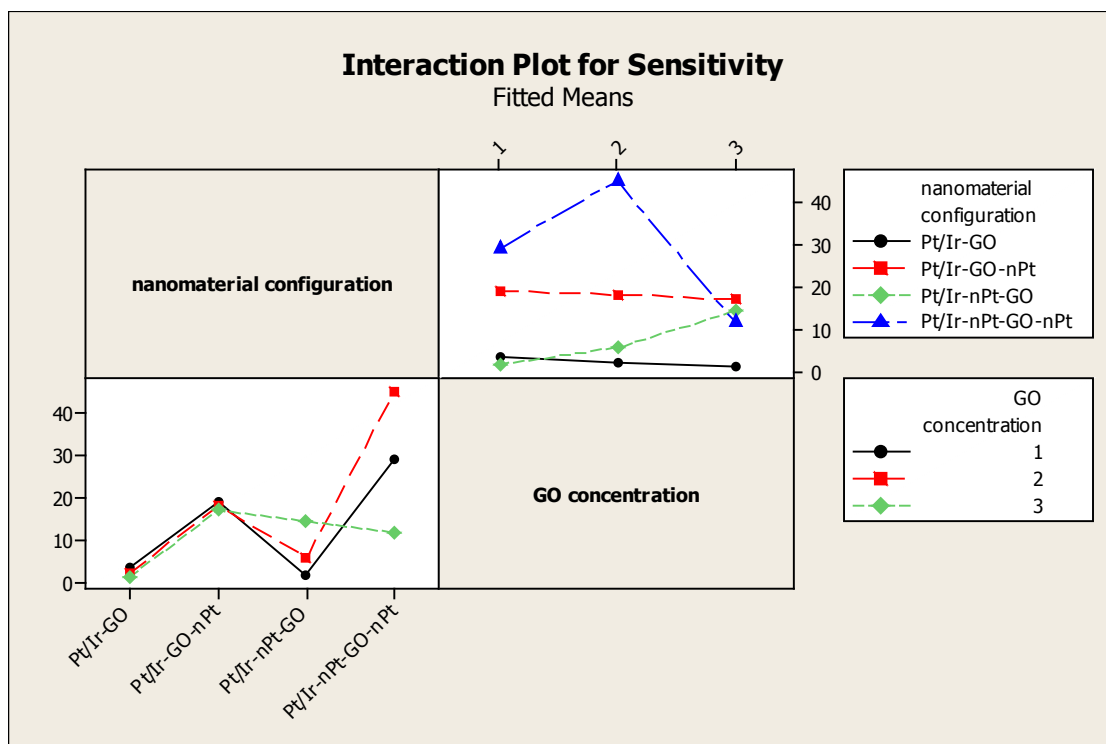
Supplemental table 1. Anova general linear model for MWCNT-based nanomaterial platforms.

Factor	Type	Levels	Values
nanomaterial configuration	fixed	4	Pt/Ir-MWCNT, Pt/Ir-MWCNT-nPt, Pt/Ir-nPt-MWCNT, Pt/Ir-nPt-MWCNT-nPt
MWCNT concentration	fixed	3	1, 2, 3

Analysis of Variance for Sensitivity, using Adjusted SS for Tests						
Source	DF	Seq SS	Adj SS	Adj MS	F	P
nanomaterial configuration	3	14933.5	14933.5	4977.8	22.84	0.000
MWCNT concentration	2	132.2	132.2	66.1	0.30	0.741
nanomaterial configuration* MWCNT concentration	6	1896.3	1896.3	316.0	1.45	0.237
Error	24	5231.7	5231.7	218.0		
Total	35	22193.7				

S = 14.7644 R-Sq = 76.43% R-Sq(adj) = 65.62%

*Normal distribution, independence, and homogeneity of variances were checked through residual plots and Levene's test.



Supplemental Figure 4. Interaction plot showing the combined effect of both factors (configuration/GO concentration) on the electrochemical sensitivity of the GO-modified electrodes.

Supplemental table 2. Anova general linear model for GO-based nanomaterial platforms.

Factor	Type	Levels	Values
nanomaterial configuration	fixed	4	Pt/Ir-GO, Pt/Ir-GO-nPt, Pt/Ir-nPt-GO, Pt/Ir-nPt-GO-nPt
GO concentration	fixed	3	1, 2, 3

Analysis of Variance for Sensitivity, using Adjusted SS for Tests

Source	DF	Seq SS	Adj SS	Adj MS	F	P
nanomaterial configuration	3	3763.18	3763.18	1254.39	96.34	0.000
GO concentration	2	277.47	277.47	138.74	10.65	0.000
nanomaterial configuration* GO concentration	6	1664.47	1664.47	277.41	21.31	0.000
Error	24	312.50	312.50	13.02		
Total	35	6017.63				

S = 3.60844 R-Sq = 94.81% R-Sq(adj) = 92.43%

*Normal distribution, independence, and homogeneity of variances were checked through residual plots and Levene's test.

Supplemental table 3. Tukey test for GO-based nanomaterial platforms.

Grouping Information Using Tukey Method and 95.0% Confidence				
nanomaterial configuration				
	N	Mean	Grouping	
Pt/Ir-nPt-GO-nPt	9	28.856	A	
Pt/Ir-GO-nPt	9	18.333	B	
Pt/Ir-nPt-GO	9	7.400	C	
Pt/Ir-GO	9	2.367	D	
Means that do not share a letter are significantly different.				
Tukey Simultaneous Tests				
Response Variable Sensitivity				
All Pairwise Comparisons among Levels of nanomaterial configuration				
nanomaterial configuration = Pt/Ir-GO subtracted from:				
nanomaterial configuration	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Pt/Ir-GO-nPt	15.967	1.701	9.386	0.0000
Pt/Ir-nPt-GO	5.033	1.701	2.959	0.0323
Pt/Ir-nPt-GO-nPt	26.489	1.701	15.572	0.0000
nanomaterial configuration = Pt/Ir-GO-nPt subtracted from:				
nanomaterial configuration	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Pt/Ir-nPt-GO	-10.93	1.701	-6.427	0.0000
Pt/Ir-nPt-GO-nPt	10.52	1.701	6.186	0.0000
nanomaterial configuration = Pt/Ir-nPt-GO subtracted from:				
nanomaterial configuration	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
Pt/Ir-nPt-GO-nPt	21.46	1.701	12.61	0.0000
Grouping Information Using Tukey Method and 95.0% Confidence				
GO concentration				
	N	Mean	Grouping	
2	12	17.925	A	
1	12	13.567	B	
3	12	11.225	B	
Means that do not share a letter are significantly different.				
Tukey Simultaneous Tests				
Response Variable Sensitivity				
All Pairwise Comparisons among Levels of GO concentration				
GO concentration = 1 subtracted from:				
GO concentration	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
2	4.358	1.473	2.959	0.0181
3	-2.342	1.473	-1.590	0.2694
GO concentration = 2 subtracted from:				
GO concentration	Difference of Means	SE of Difference	T-Value	Adjusted P-Value
3	-6.700	1.473	-4.548	0.0004