

Nanostructuring of Biosensing Electrodes with Nanodiamonds For Protein Immobilization with Chemical Stability

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Supporting Information

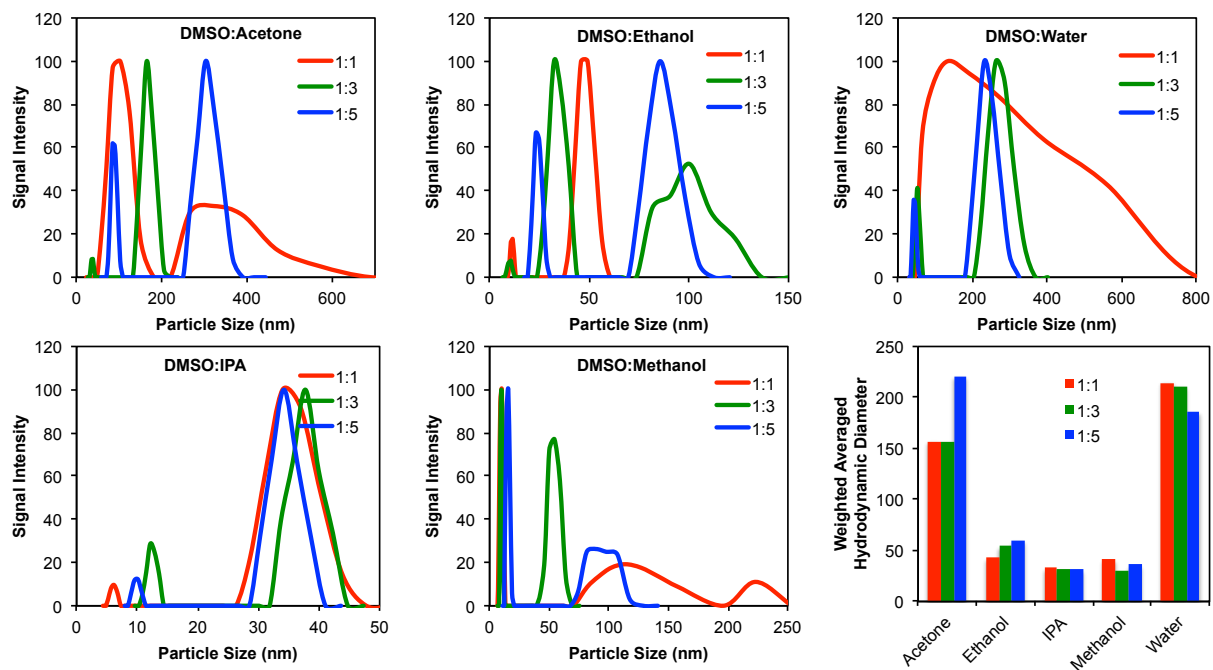


Figure S1. Results from photon correlation spectroscopy showing size distribution of ND aggregates obtained by diluting the original ND:DMSO solution with acetone, ethanol, water, IPA, and methanol.

Table S1. Properties of solvent mixtures estimated from molar ratio weighted calculations.

Solvent	Dilution Ratio	Molar Ratio	Dielectric Constant	Refractive Index	Density g/ml	Viscosity mPa-s
Acetone	1:1	0.4919	34.0572	1.4200	0.9390	0.5802
	1:3	0.7439	27.5817	1.3897	0.8625	0.4225
	1:5	0.8288	25.3997	1.3795	0.8370	0.3870
Ethanol	1:1	0.5506	34.5036	1.4140	0.9405	1.4465
	1:3	0.7861	29.2870	1.3862	0.8648	1.2705
	1:5	0.8597	27.6580	1.3776	0.8395	1.2239
IPA	1:1	0.4831	32.8357	1.4297	0.9385	2.2453
	1:3	0.7371	25.5455	1.4038	0.8618	2.3049
	1:5	0.8237	23.0594	1.3950	0.8362	2.3259
Methanol	1:1	0.6385	37.9524	1.3826	0.9415	0.8028
	1:3	0.8412	35.1749	1.3520	0.8663	0.6699
	1:5	0.8983	34.3934	1.3434	0.8412	0.6401
Water	1:1	0.7985	73.2897	1.3624	1.0450	1.1253
	1:3	0.9224	77.4161	1.3443	1.0215	1.0481
	1:5	0.9520	78.4000	1.3400	1.0137	1.0313

Table S2. Equivalent Circuit Fit Values For The Other Two Active Sensors.

Parameters	Active Sensor 2			Active Sensor 3		
	After antibody immobilization and blocking with casein	After capture from 10 ⁶ cfu/ml	After capture from 10 ⁸ cfu/ml	After antibody immobilization and blocking with casein	After capture from 10 ⁶ cfu/ml	After capture from 10 ⁸ cfu/ml
R1 (Ω)	13,591	9,148	8,269	21,655	13,498	10,105
R3 (Ω)	1,774	1,170	1,039	1,720	1,055	925
Ws1-R (Ω)	489,690	469,680	480,090	721,470	612,930	648,700
Ws1-T	5.02 x 10 ⁻³			5.07 x 10 ⁻³		
Ws1-P	0.7679			0.73527		
R2 (Ω)	25			25		
C1 (F)	2.75 x 10 ⁻⁹			2.10 x 10 ⁻⁹		
C2 (F)	1.46 x 10 ⁻⁹			1.55 x 10 ⁻⁹		

Table S3. Equivalent Circuit Fit Values For The Other Control Sensor.

Control Sensor 2			
Parameters	After antibody immobilization and blocking with casein	After capture from 10⁶ cfu/ml	After capture from 10⁸ cfu/ml
R3 (Ω)	1,773	1,348	1,077
Ws1-R (Ω)	1.13×10^6	9.5×10^5	9.3×10^5
Ws1-T		8.6×10^{-3}	
Ws1-P		0.54	
R2 (Ω)		25	
C1 (F)		2.1×10^{-9}	
C2 (F)		1.3×10^{-9}	
R1 (Ω)		1×10^{-7}	