Sequential Layer Analysis of Protein Immunosensors based on Single Wall Carbon Nanotube Forests

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Supporting Information:

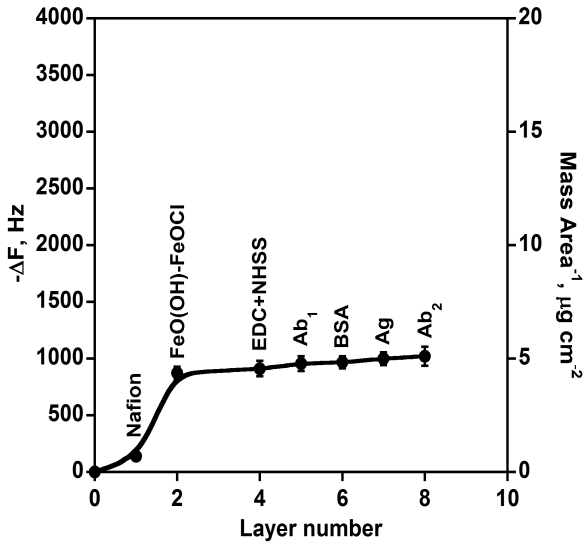

Figure S1. QCM frequency shifts (left) and mass per unit area (right) of layers in PSA-control sensor (without SWNT forests) assembled on gold resonators: 1. Nafion; 2. FeO(OH)-FeOCl/ Nafion bilayer; 4. 400 mM EDC and 100 mM NHSS in water; 5. after addition (non - covalent linkage) of 2 nmol mL^{-1} primary anti-PSA antibody (Ab$_1$) in 0.05% Tween-20 PBS buffer; 5. adsorption of 2% BSA in 0.05% Tween-20 PBS buffer onto antibody; 6. adsorption of 40 ng mL^{-1} PSA in calf serum; 7. adsorption of 4 pmol mL^{-1} Ab$_2$-HRP in PBS containing 0.05% Tween-20.

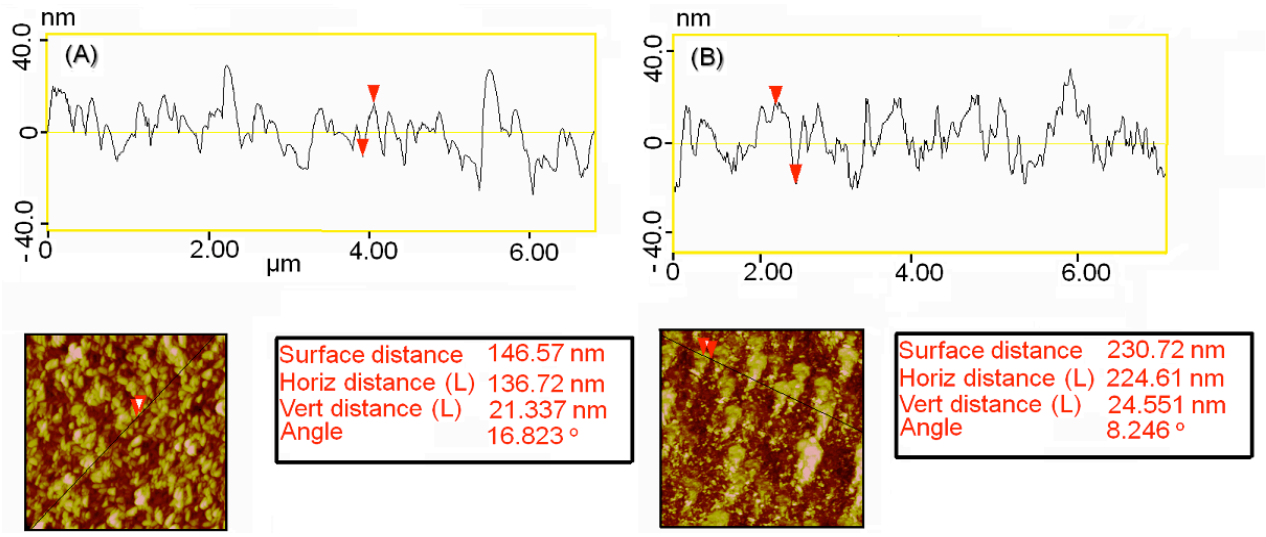

Figure S2. Section analysis of layers in sensor fabrication and use: (A) Nafion/ FeO(OH)-FeOCl bilayer; (B) SWNT forests on Nafion/ FeO(OH)-FeOCl bilayer conducted by moving two cursors along reference line shown until they arrive at the opposite sides of a typical peak corresponding to a bundle of SWNTs. Vertical distance between the two cursors indicate the vertical height of each layer from the surface (mica).

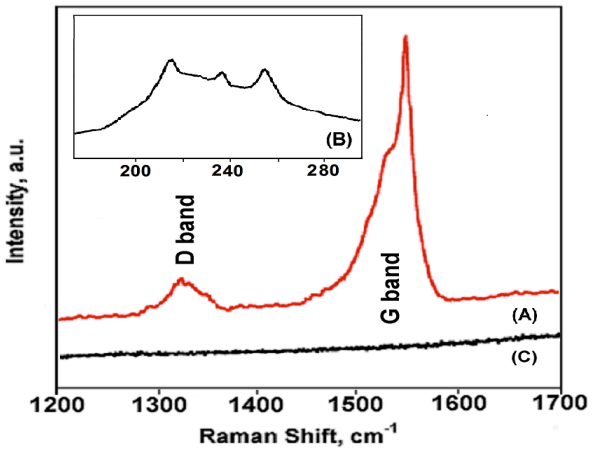

Figure S3. Resonance Raman spectra (785 nm excitation) of (A) Nafion/FeO(OH)-FeOCl/SWNT forests on mica with D-band at 1330 cm^{-1} and G-band at 1550 cm^{-1}; (B) RBM bands in the low frequency region at 212 cm^{-1}, 235 cm^{-1}, and 256 cm^{-1}; (C) control, bare mica.

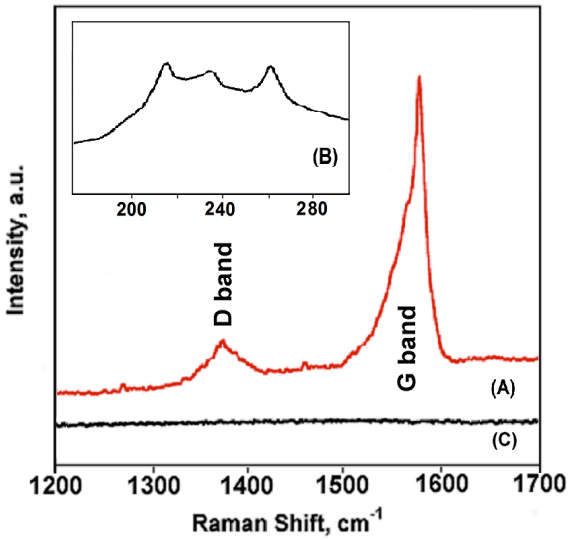

Figure S4. Laser Raman spectra (785 nm excitation) of (A) Nafion/FeO(OH)-FeOCl/SWNT forests on glass substrate with D-band at 1380 cm^{-1} and G-band at 1580 cm^{-1}; (B) RBM bands at 210 cm^{-1}, 236 cm^{-1}, and 265 cm^{-1}; (C) control, bare glass.

Using ferrocyanide in 0.1 M KCl as a probe, we used cyclic voltammetry and the Randles–Sevcik equation to estimate surface areas for the bare PG underlayer and the SWNT forests. Specifically, values were SWNT forests, 0.29 cm^2 and PG 0.14 cm^2