

Supporting Information

Electrochemical Modification of Indium Tin Oxide Using Di(4-nitrophenyl) Iodonium Tetrafluoroborate

Matthew R. Charlton,^{‡,†,ψ} Kristin J. Suhr,^{‡,§} Bradley J. Holliday^{,§}, and Keith J. Stevenson^{*,†,§}*

[†]Texas Materials Institutes, ^ψMaterials Science & Engineering Graduate Program, and

[§]Department of Chemistry, The University of Texas at Austin, Austin, TX 78712, United States

[‡]Matthew Charlton and Kristin Suhr contributed equally towards performing experiments,

analyzing data, and writing.

Corresponding Author

*E-mail: bholliday@cm.utexas.edu, stevenson@cm.utexas.edu

Method Used to Normalize the N:In atomic ratios

In order to compensate for the XPS signal attenuation of the substrate components upon grafting (illustrated in Figure S3), the reported N:In ratios have been normalized to the original In 3*d* intensity of the ITO control (In_o), according to the following formula:

$$\frac{I(\text{In}_i)}{I(\text{In}_o)} * \frac{\%N_i}{\%\text{In}_i} = N_i : \text{In}_o \quad (1),$$

where $I(\text{In}_i)$ and $I(\text{In}_o)$ are the raw intensities of the In 3*d* peaks in the grafted samples and the ITO control, respectively, and $\%N_i$ and $\%\text{In}_i$ are the relative atomic percents of N and In in the grafted samples, respectively. This was done in an effort to clarify the comparison between the two ratios.

Methods Used to Calculate R_s , R_{CT} , and C_{dl}

The R_s was measured as the magnitude of the lower plateau of the Bode plot, also represented by the high frequency Z_{Real} intercept in the Nyquist plots. The R_{CT} was calculated as the difference between the magnitudes of the upper and lower plateaus in the Bode plot, or alternatively by calculating the diameter of the semicircular section in the Nyquist plot. The inverse of the interfacial capacitance, $1/C_{dl}$, was calculated as the product of R_{CT} and the angular frequency at the maximum of the imaginary impedance component, $\omega_{\text{max}} Z''$. This is represented graphically as the linear extrapolation of the mid-frequency sloped region extended back to $\log(\omega) = 0$.¹

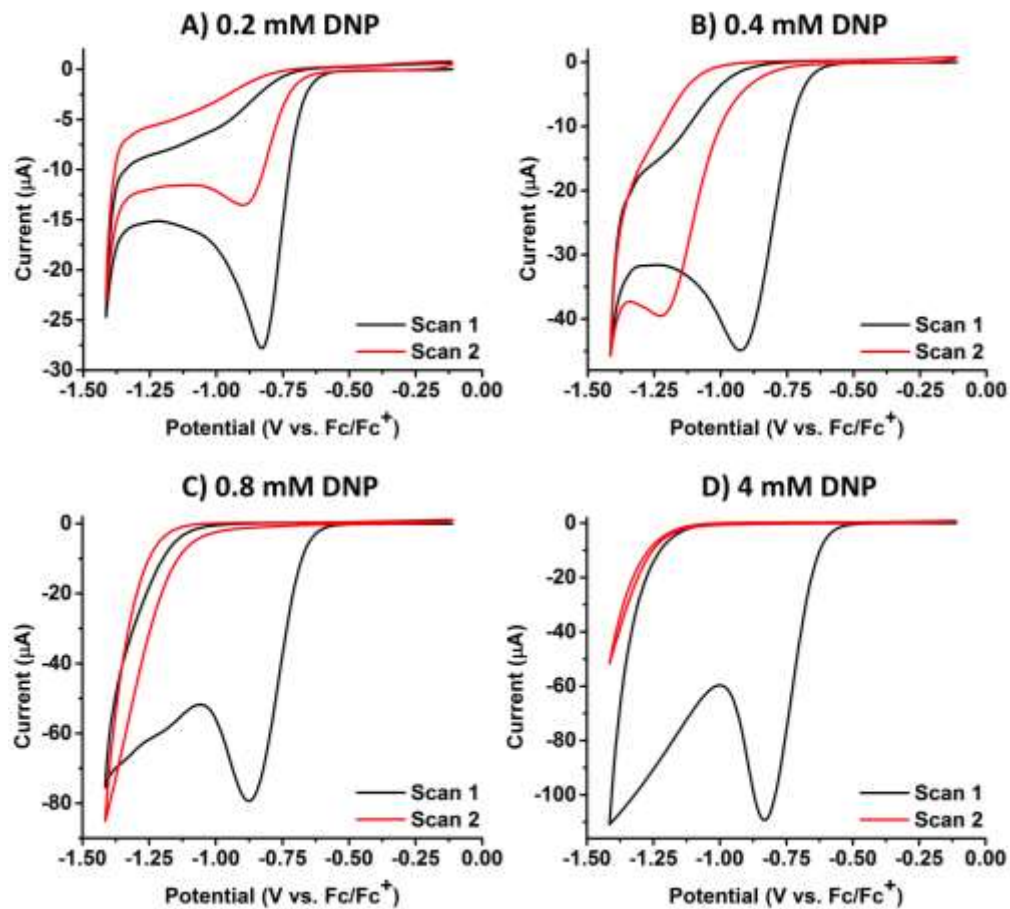


Figure S1. Cyclic voltammetry of DNP grafting onto ITO (2 scans) at concentrations of 0.2 mM (A), 0.4 mM (B), 0.8 mM (C), and 4.0 mM (D). As the concentration increases, the reduction peak current increases as does the passivation of the second scan.

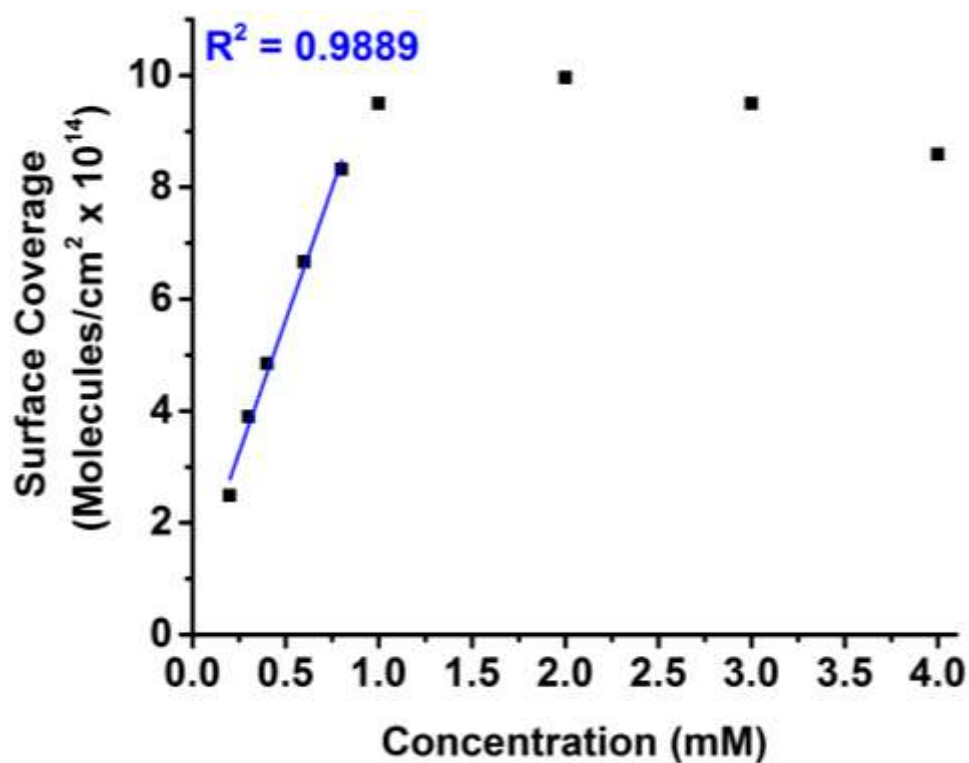


Figure S2. Graph of surface coverage, based on the NO₂ oxidation peak, as a function of grafting DNP concentration. The integrations of the oxidation peaks yield larger calculated surface coverage values than for the reduction peaks as they also include the oxidation of the species reduced just prior to the CV scan reversal.

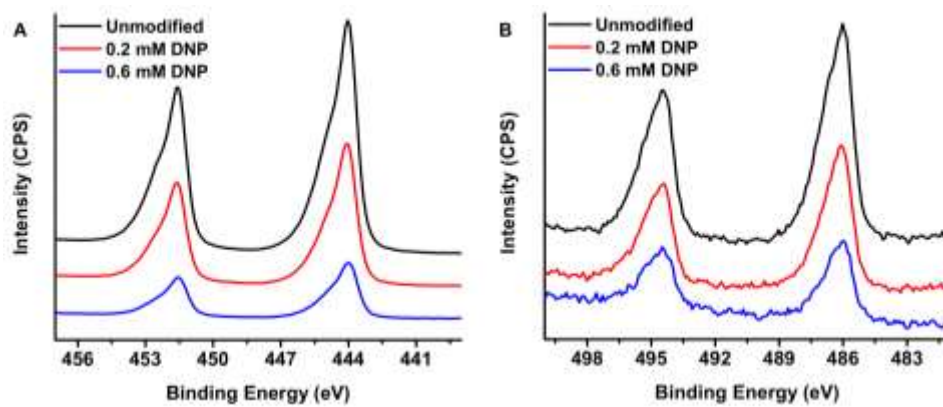


Figure S3. XPS spectra of In 3d (A) and Sn 3d (B) of the unmodified and modified ITO electrodes.

- (1) Mansfeld, F. Recording and Analysis of AC Impedance Data for Corrosion Studies.
Corrosion **1981**, 37, 301–307.