

## Supplementary Information

### *Single Layer Graphene as an Electrochemical Platform*

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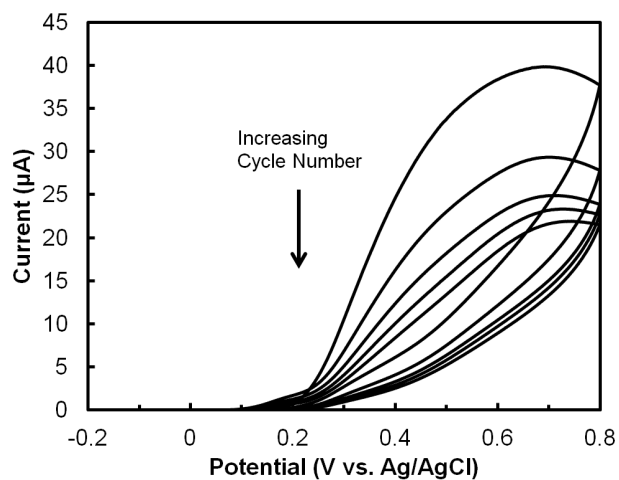
**Figure S4.** Raman spectra of ITO/poly-[Ru(v-bpy)<sub>3</sub>]<sup>2+</sup>/graphene before and after ECL.

Page S4 **Figure S5.** Cyclic voltammograms of poly-[Ru(v-bpy)<sub>3</sub>]<sup>2+</sup> before and after ECL with C<sub>2</sub>O<sub>4</sub><sup>2-</sup>.

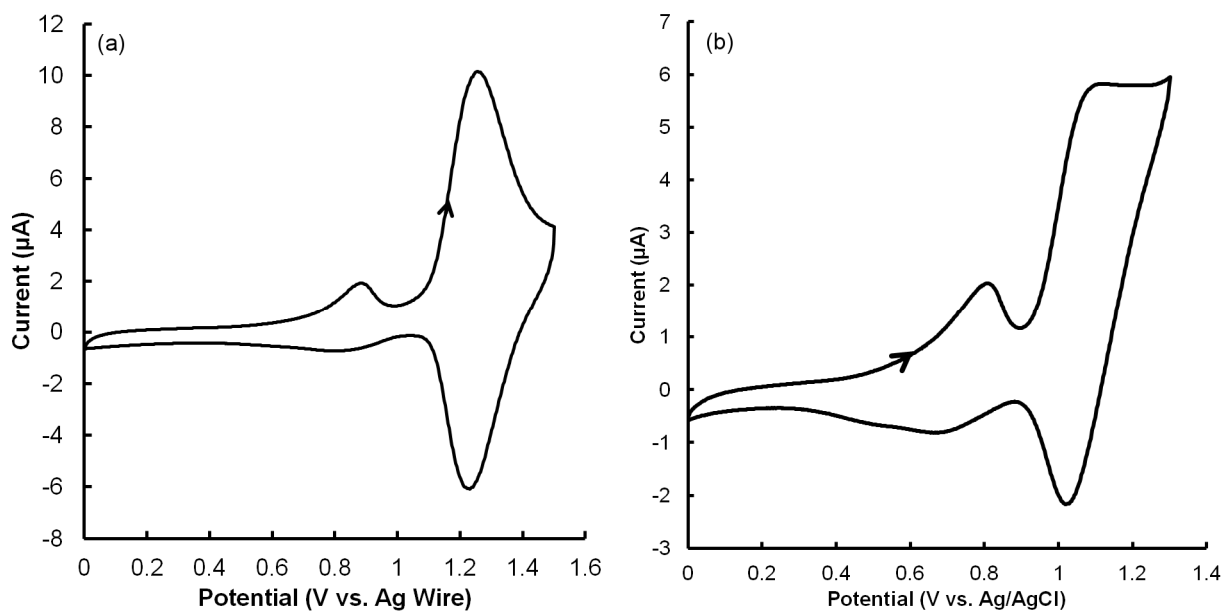
**Figure S6.** Cyclic voltammograms of immobilized 3,4-DHB on graphene at different sweep rates.

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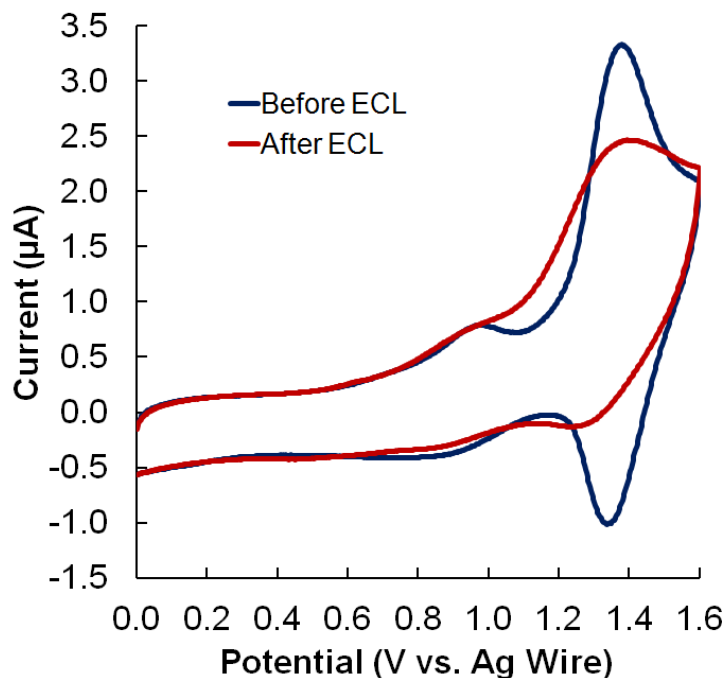
<sup>b</sup> Laboratory of Atomic and Solid State Physics, Department of Physics, Cornell University, Ithaca, NY, 14853, USA. Fax: 1-607-255-6428; Tel: 1-607-255-9644; E-mail: ralph@ccmr.cornell.edu



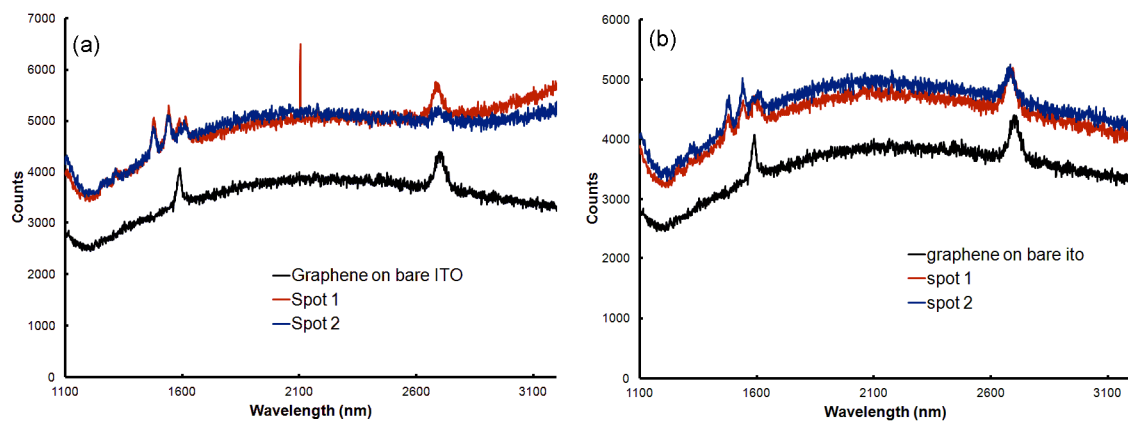
**Figure S1.** Cyclic voltammogram of graphene in 1mM 3,4-dihydroxybenzaldehyde. Sweep rate, 25 mV/s; supporting electrolyte, 0.1 M Tris buffer, pH 8.21, with 0.1 M NaNO<sub>3</sub>; electrode area, 0.5 cm<sup>2</sup>.



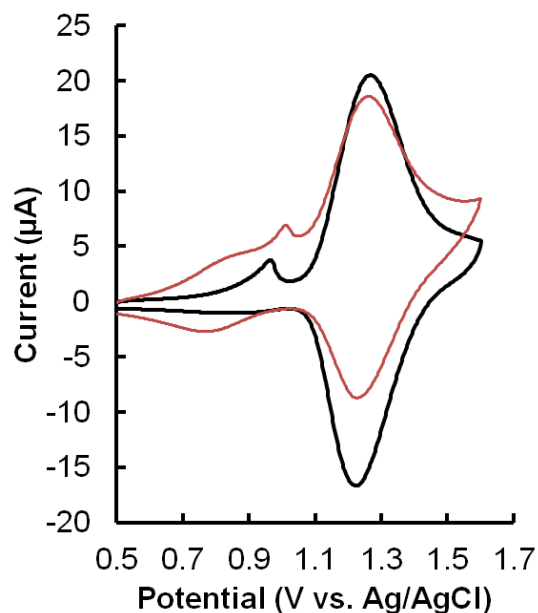
**Figure S2.** Typical cyclic voltammograms of electropolymerized [Ru(v-bpy)<sub>3</sub>]<sup>2+</sup> on ITO in (a) 0.1 M TBAPF<sub>6</sub> in acetonitrile and (b) in 0.2 M sodium phosphate buffer, pH 7.0. Sweep rate, 100 mV/s; electrode area, 0.5 cm<sup>2</sup>.



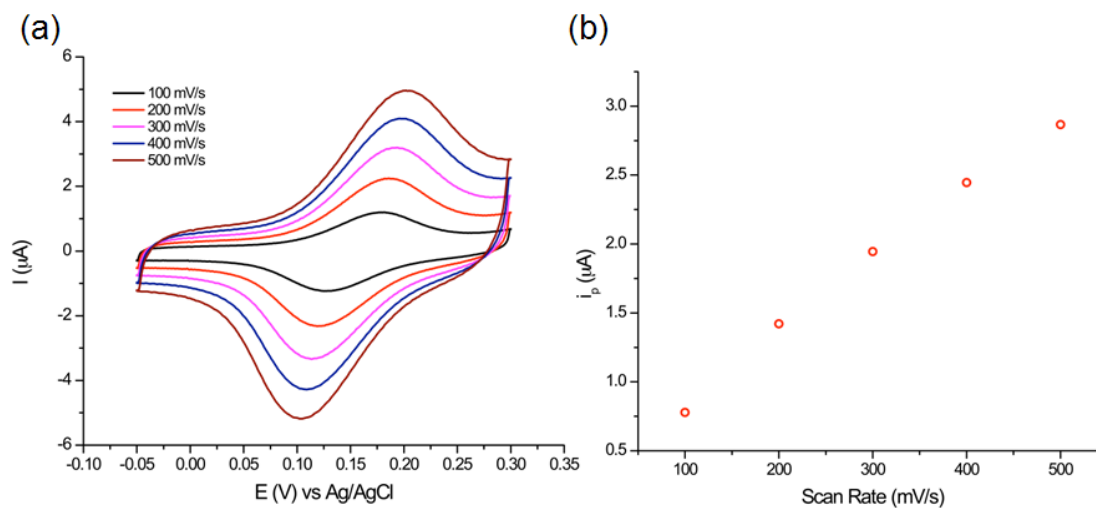
**Figure S3.** Cyclic voltammograms of electropolymerized  $[\text{Ru}(\text{v-bpy})_3]^{2+}$  on ITO before (blue) and after (red) ECL in 0.13 M tripropylamine in 0.2 M phosphate buffer, pH 7.0. Sweep rate, 100 mV/s; supporting electrolyte, 0.1 M TBAPF<sub>6</sub> in acetonitrile; electrode area, 0.5 cm<sup>2</sup>.



**Figure S4.** Raman spectra of ITO/poly- $[\text{Ru}(\text{v-bpy})_3]^{2+}$ /graphene (a) before and (a) after ECL. Excitation wavelength, 488 nm.



**Figure S5.** Cyclic voltammograms of electropolymerized  $[\text{Ru}(\text{v-bpy})_3]^{2+}$  on ITO in 0.1 M TBAPF<sub>6</sub> before (black) and after (red) ECL in 50 mM sodium oxalate. Sweep rate, 100 mV/s; electrode area, 0.5 cm<sup>2</sup>; supporting electrolyte, 0.1 M sodium acetate buffer, pH 4.6



**Figure S6.** (a) Immobilized 3,4-dihydroxybenzaldehyde on graphene in 0.1 M Tris buffer, pH 8.21, with 0.1 M NaNO<sub>3</sub> at different sweep rates. (b) Corresponding plot of peak current versus sweep rate.