Supporting Information

Electrochemistry, ECL and Excimer Formation Dynamics of Intramolecular π-stacked 9-Naphthylanthracene Derivatives and Organic Nanoparticles

Jungdon Suk[a], Zhiyong Wu[b], Lei Wang[b*] and Allen J. Bard[a*]

[a]*Center for Electrochemistry and Department of Chemistry and Biochemistry, The University of Texas at Austin, Austin, Texas 78712*
[b]*Wuhan National Laboratory for Optoelectronics, Huazhong University of Science and Technology, Wuhan, P. R. China*

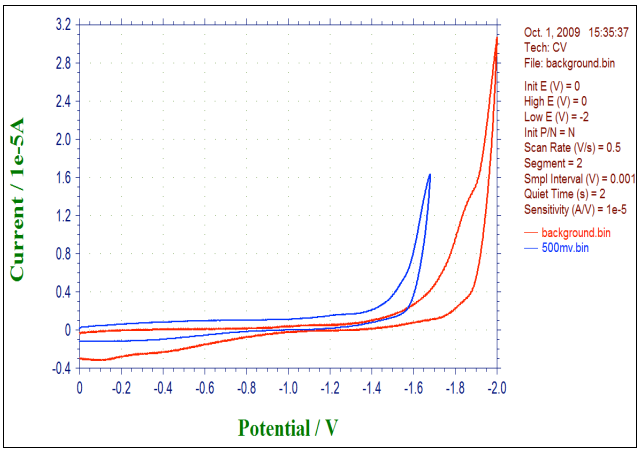

Figure S1. Reduction CV (blue line) of 0.5 mM solutions of **4A** in BZN with background CV (red line). WE: Pt disk, CE: Pt coil, RE: Ag wire as a QRE. Scan rate was 0.5 V/s.

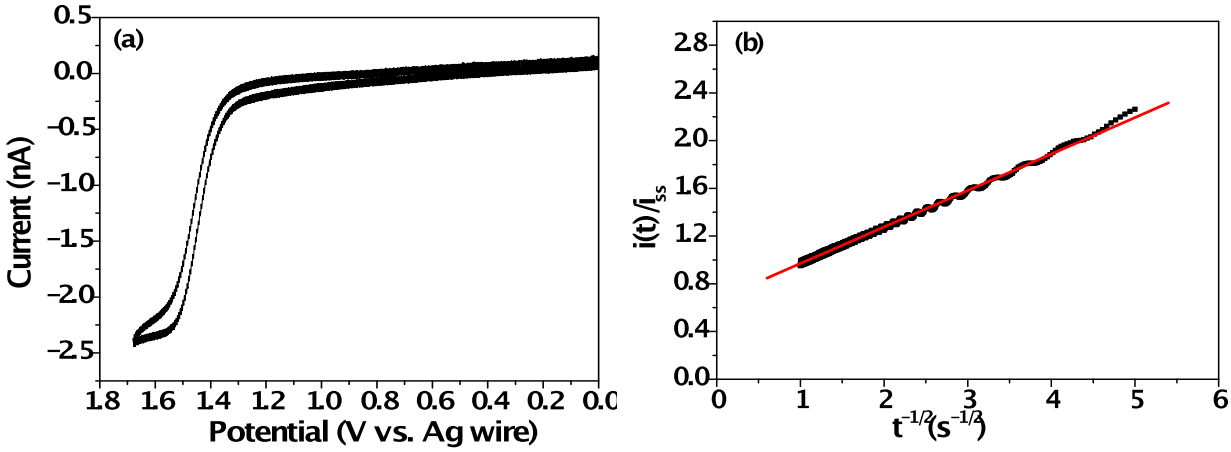

Figure S2. (a) Cyclic voltammogram of 0.5 mM **4A**. Scan rate was 0.05 V/s. (b) Plot of the experimental ratio $i_d(t)/i_{d,ss}$ against the inverse square root of time for the oxidation of 0.5 mM

4A. Sampling ratio is 10 μs per point. The result of the linear regression is shown together. Both were performed in DCM with 0.1 M $TBAPF_6$. WE: 25 μm diameter Pt UME, CE: Pt coil, RE: Ag wire as a QRE.

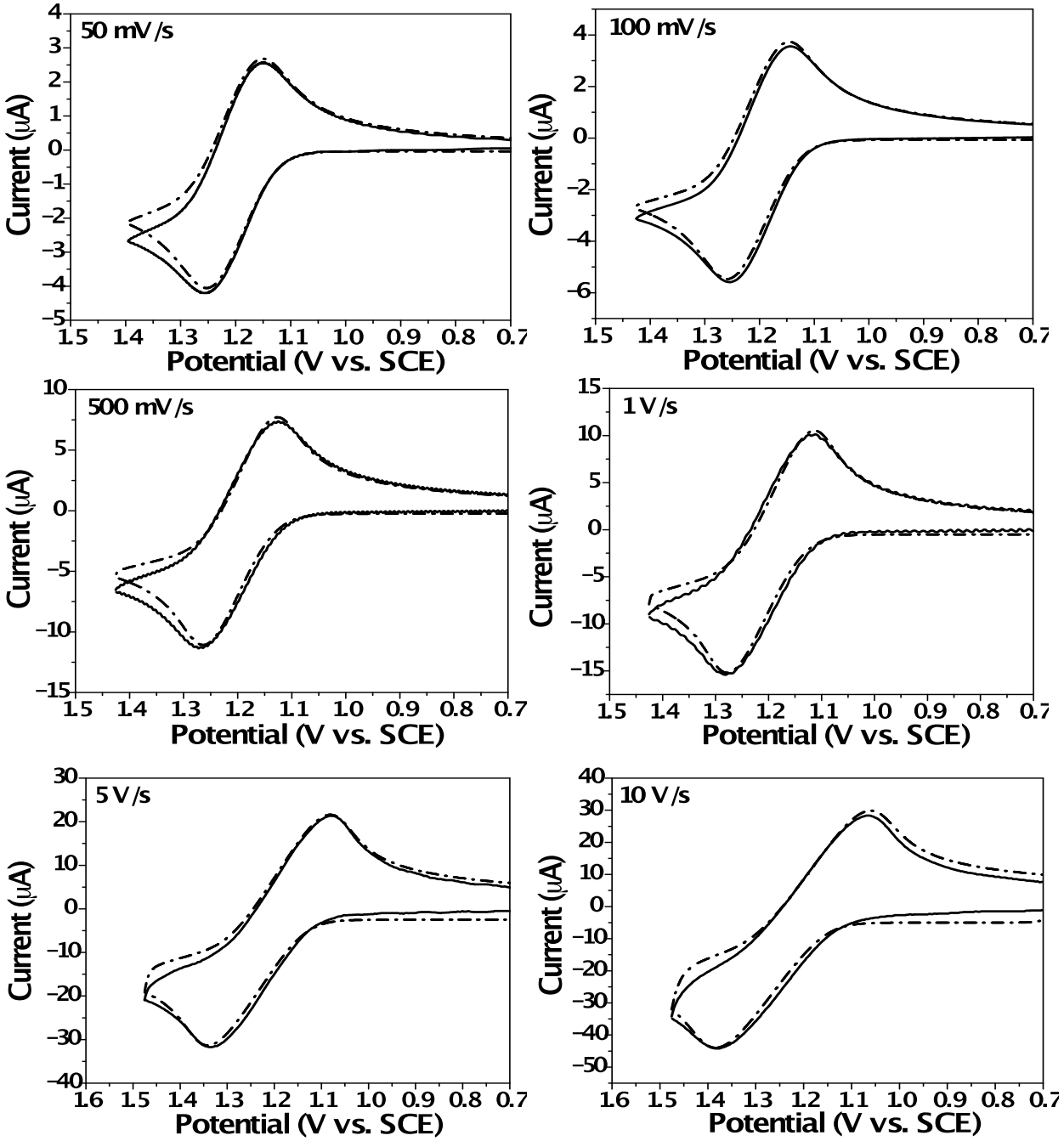

Figure S3. Experimental (solid line) and simulated (dotted line) cyclic voltammograms of 0.5 mM **4A** oxidation with scan rate from 50 mV/s to 10 V/s. Simulation mechanism is two, one-

electron oxidations and corrected for uncompensated resistance, R_u (3240 Ω) and double layer capacitance, C_d (500 nF): $E°_{1,ox}$ = 1.22 V, $E°_{2,ox}$ = 1.25 V vs. SCE, k° ≥ 10^4 cm/s, α= 0.5.

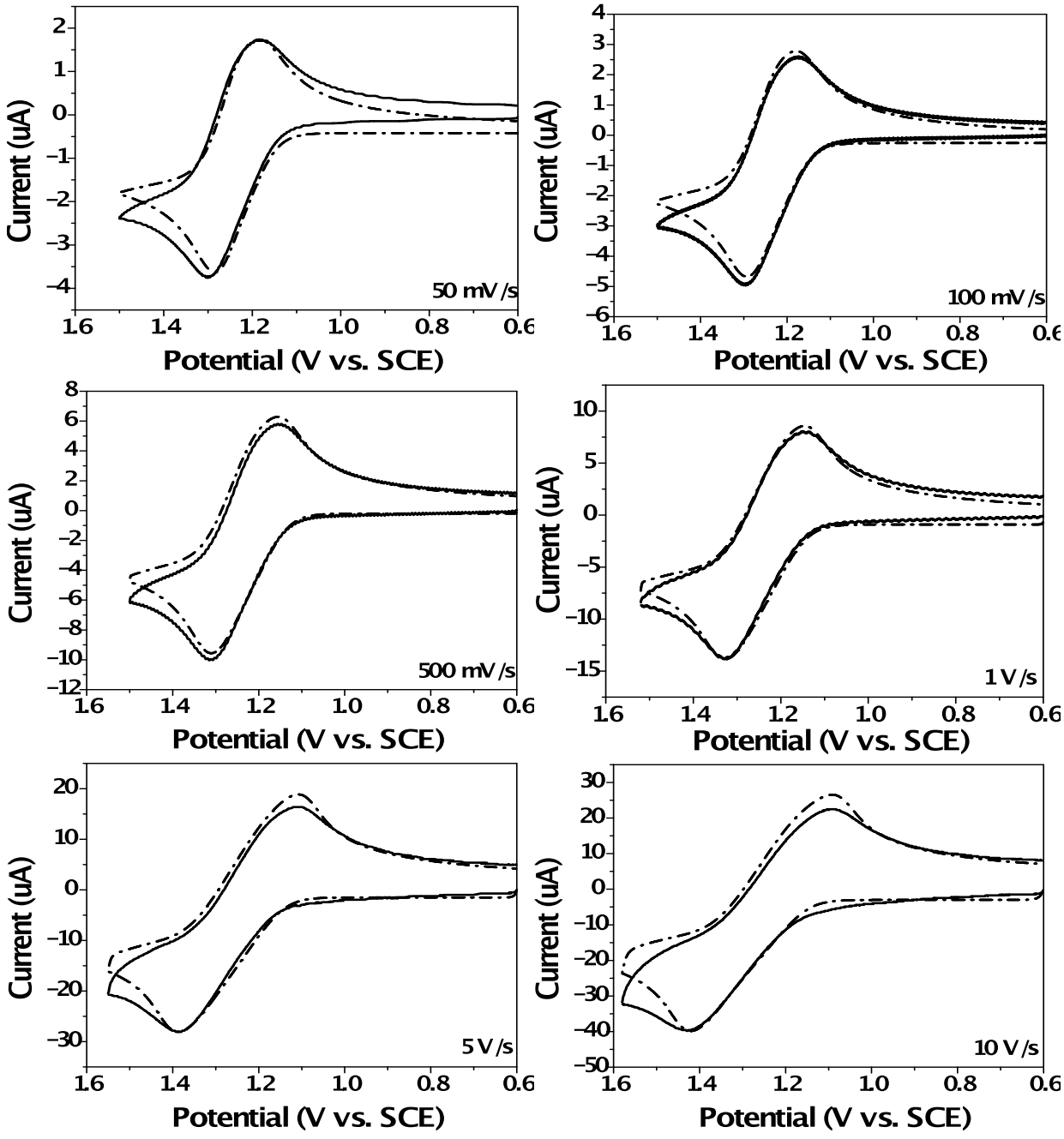

Figure S4. Experimental (solid line) and simulated (dotted line) cyclic voltammograms of 0.4 mM **4C** oxidation with scan rate from 50 mV/s to 10 V/s. Simulation mechanism is three, one-electron oxidation and corrected for uncompensated resistance, R_u (2700 Ω) and double layer

capacitance, C_d (600 nF): $E°_{1,ox}$ = 1.17 V, $E°_{2,ox}$ = 1.21 V and $E°_{3,ox}$ = 1.25 V vs. SCE, $k°\geq 10^4$ cm/s, α= 0.5.

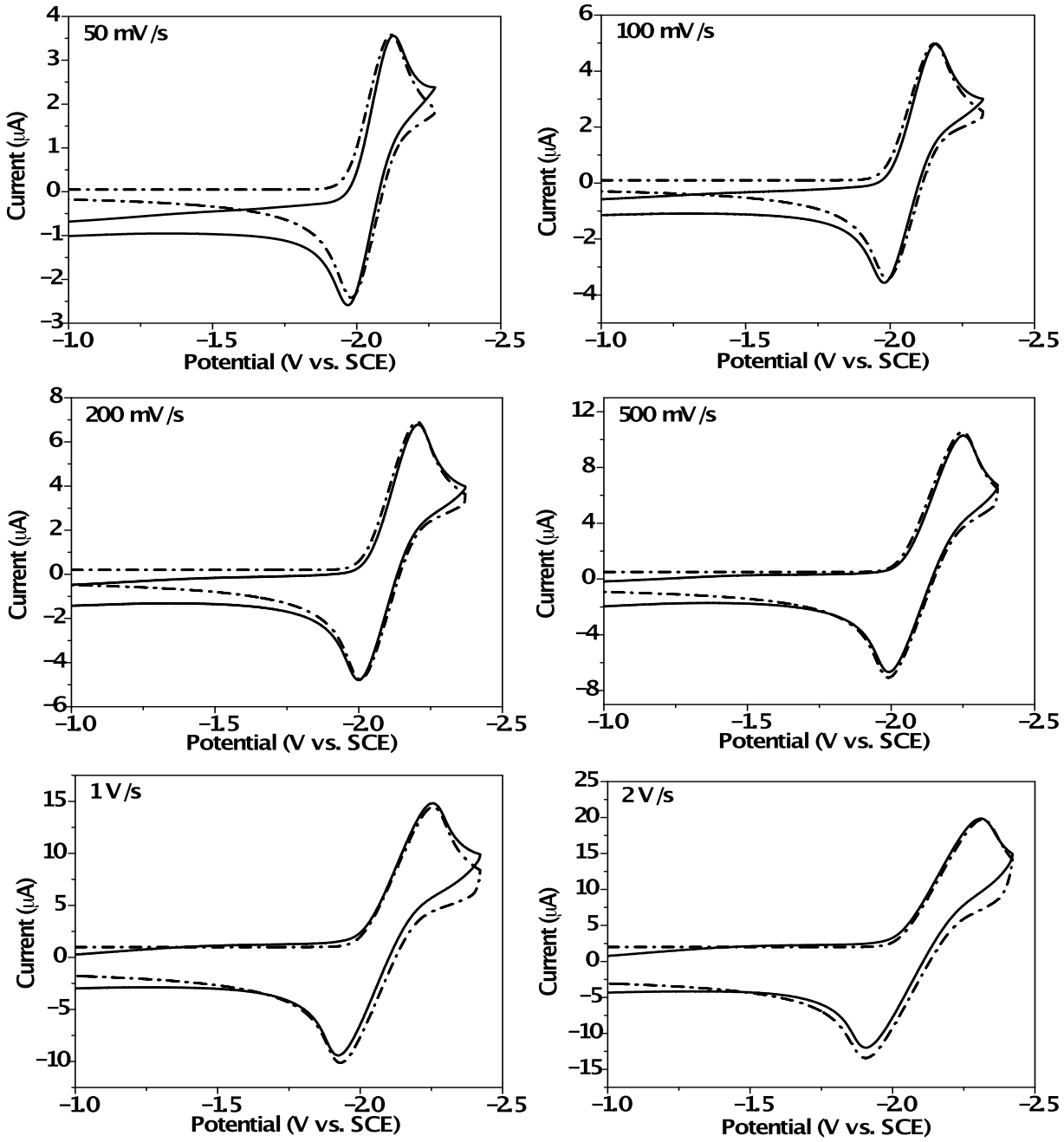

Figure S5. Experimental (solid line) and simulated (dotted line) cyclic voltammograms of 0.5 mM **4A** reduction with scan rate from 50 mV/s to 2 V/s. Simulation mechanism is two, one electron oxidation and corrected for uncompensated resistance, R_u (8092 Ω) and double layer capacitance, C_d (1000 nF): $E°_{1,red}$ = -2.08 V and $E°_{2,red}$ = -2.13 V vs. SCE, $k°\geq 10^4$ cm/s, α= 0.5.

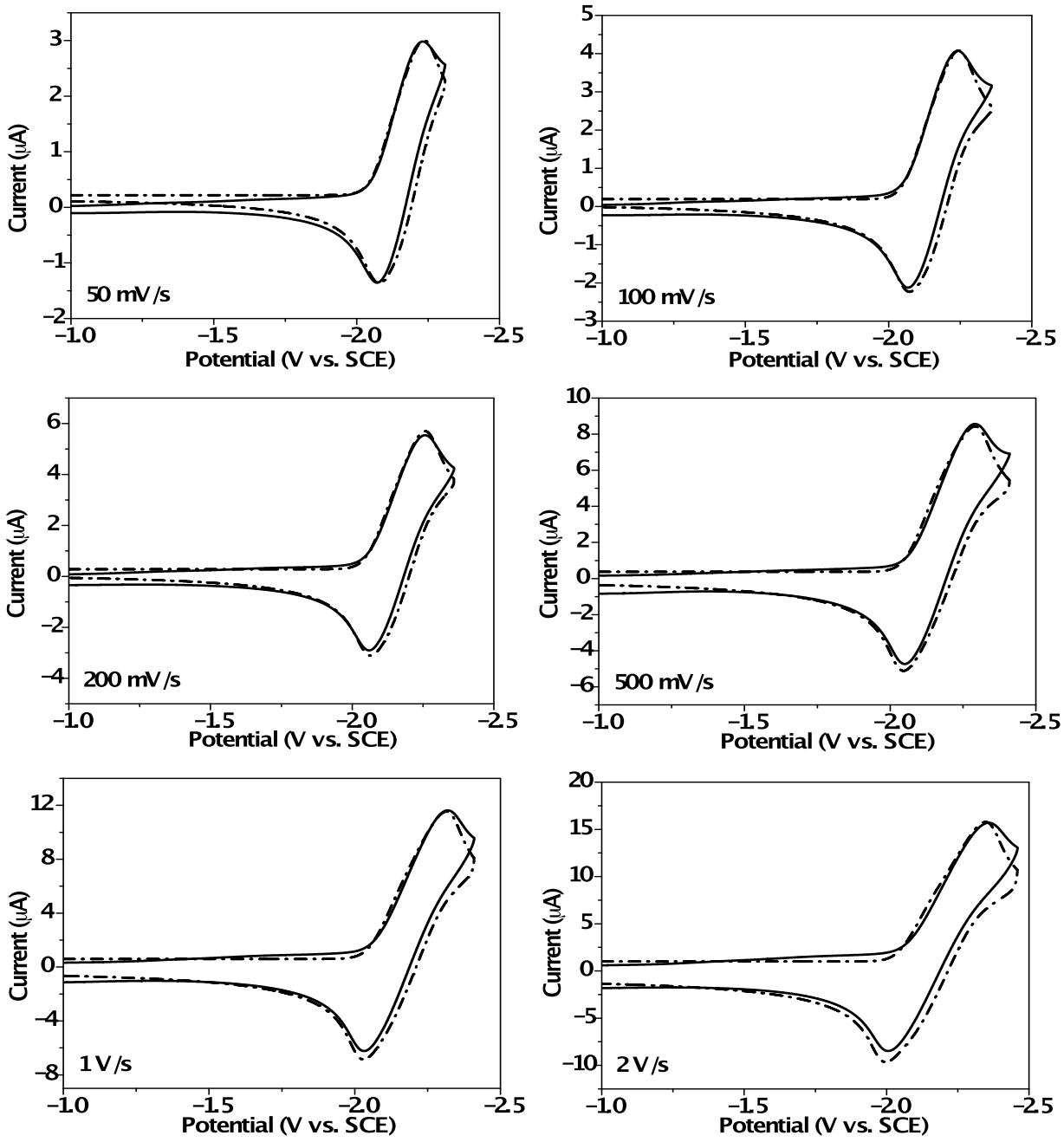

Figure S6. Experimental (solid line) and simulated (dotted line) cyclic voltammograms of 0.5 mM **4C** reduction with scan rate from 50 mV/s to 2 V/s. Simulation mechanism is two, one electron oxidation and corrected for uncompensated resistance, R_u (6659 Ω) and double layer capacitance, C_d (400 nF): $E°_{1,red}$ = -1.97 V, $E°_{2,red}$ = -2.02 V and $E°_{3,red}$= -2.07 V vs. SCE, $k° \geq 10^4$ cm/s, α= 0.5.

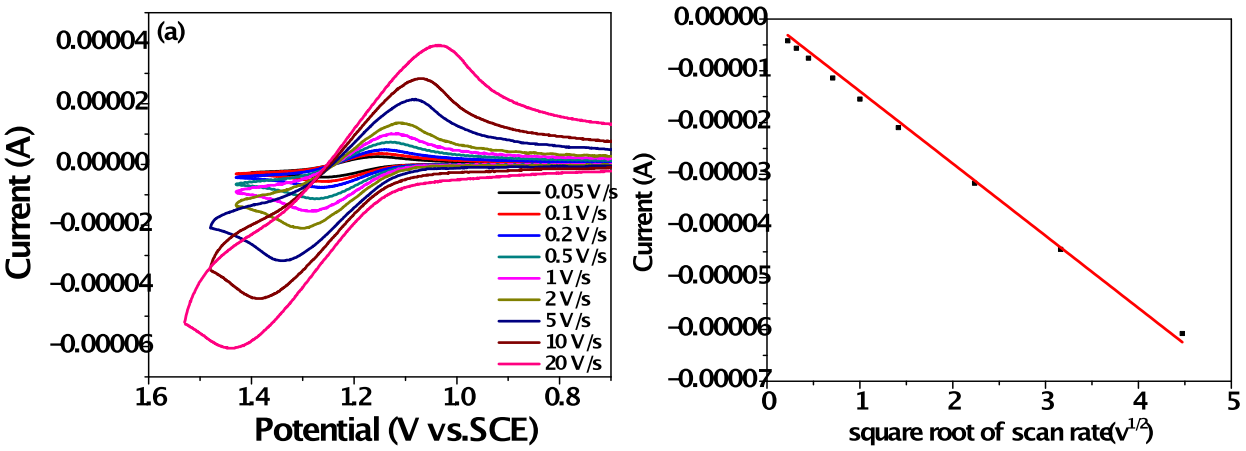

Figure S7. (a) CVs for oxidation of 0.5 mM solutions of **4A** in DCM at various scan rates. (b) Oxidation peak current versus the square root of the scan rate ($v^{1/2}$).

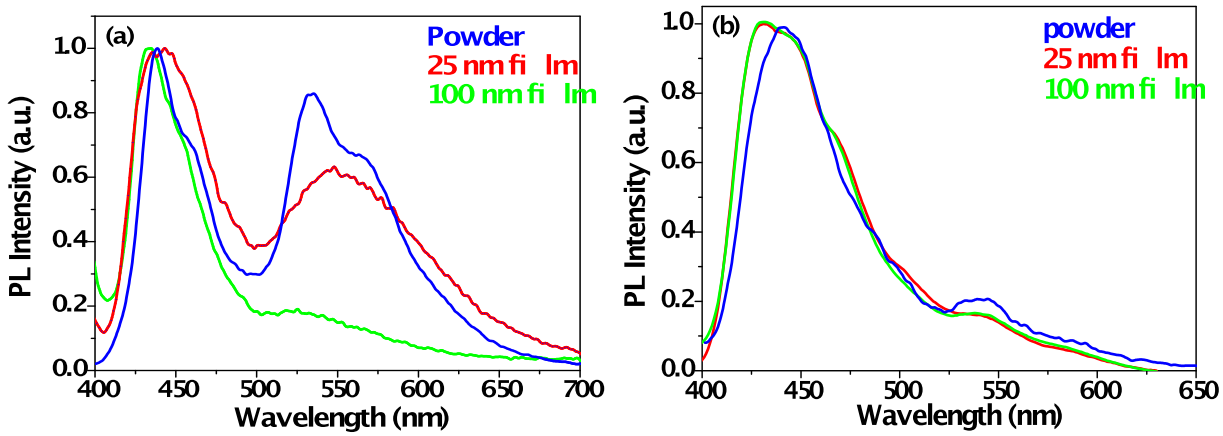

Figure S8. Film thickness dependence on the fluorescence intensity in solid state of (a) **4A** and (b) **4C**.

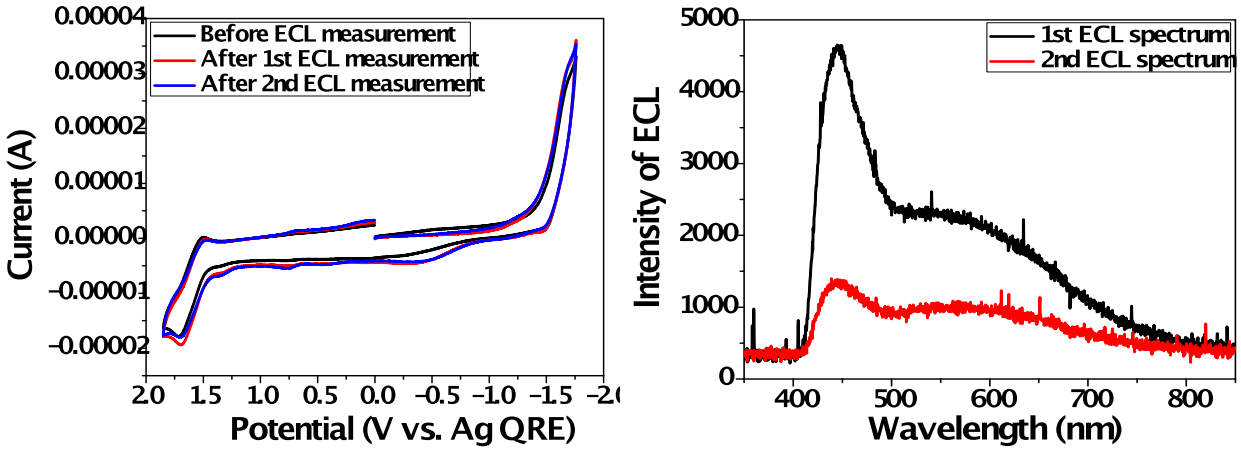

Figure S9. (a) CVs of 0.5 mM **4C** in BZN before and after ECL measurement (b) 1st and 2nd ECL spectrum of **4C.**

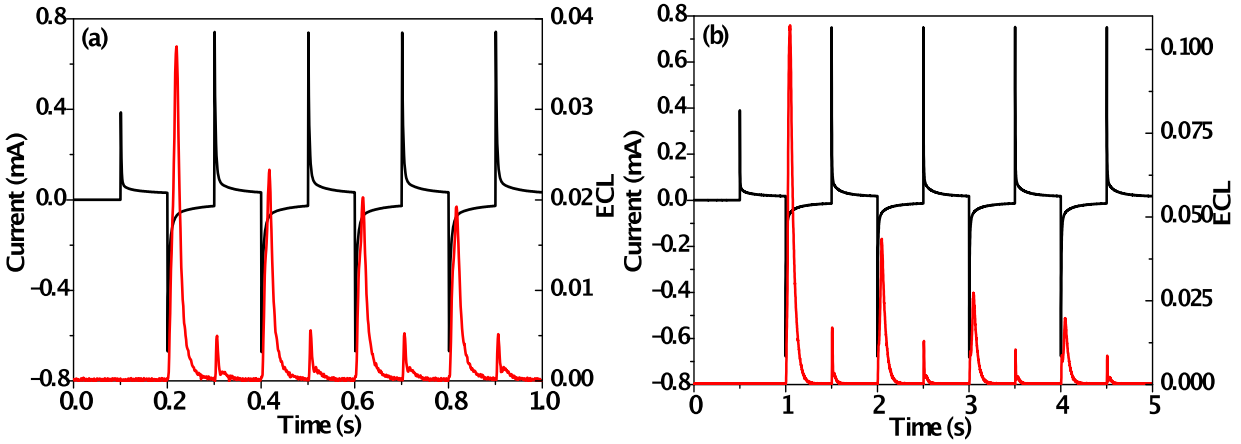

Figure S10. Initial current (black) and ECL light (red) transients for compound **4C** pulsed between and -1.96 V and + 1.44 V versus Ag quasi-reference electrode. Pulse width is (a) 0.1 s (b) 0.5 s.

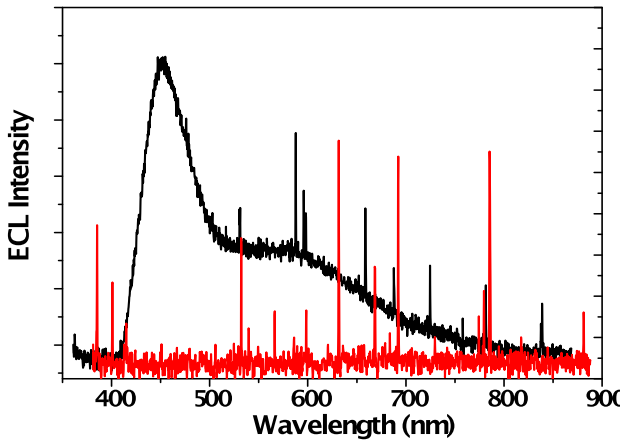

Figure S11. ECL spectrum of 0.5 mM 4A without (black line) and with (red line) 50 mM TPrA as the co-reactant.