

Supporting information

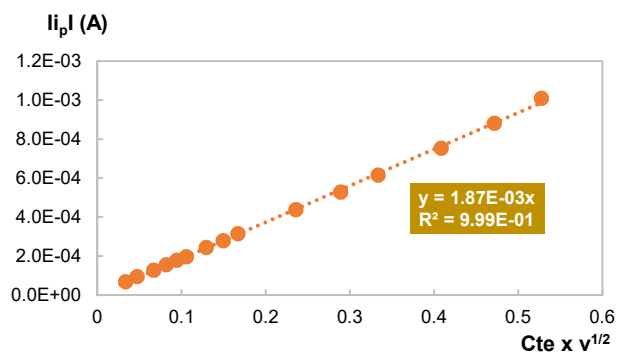


Figure S1 Diffusion coefficient evaluation of 2,3-DHAQ according to Randles-Sevcik method.

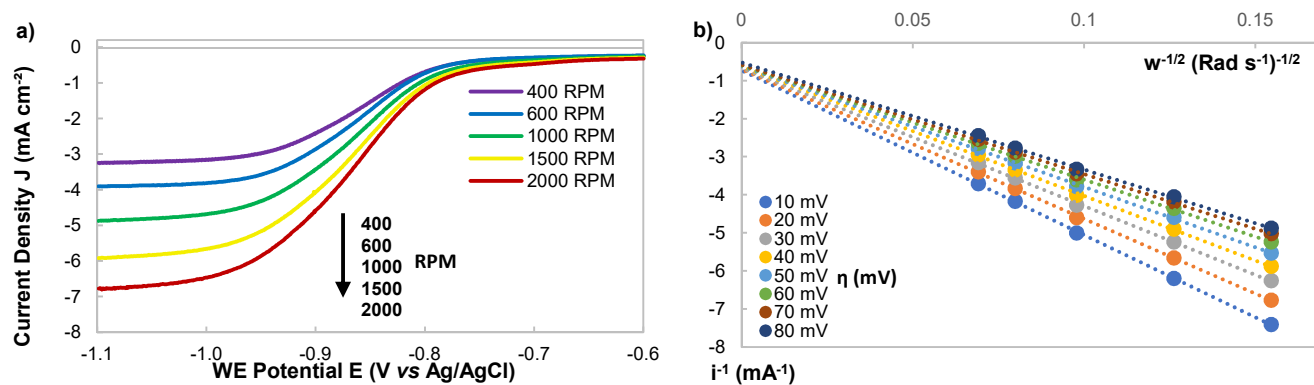


Figure S2 Determination of i_k according to Koutecký-Levich method.

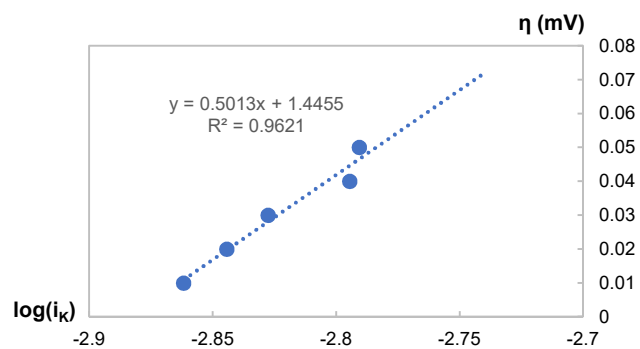


Figure S3 Determination of i_0 according to the Tafel equation.

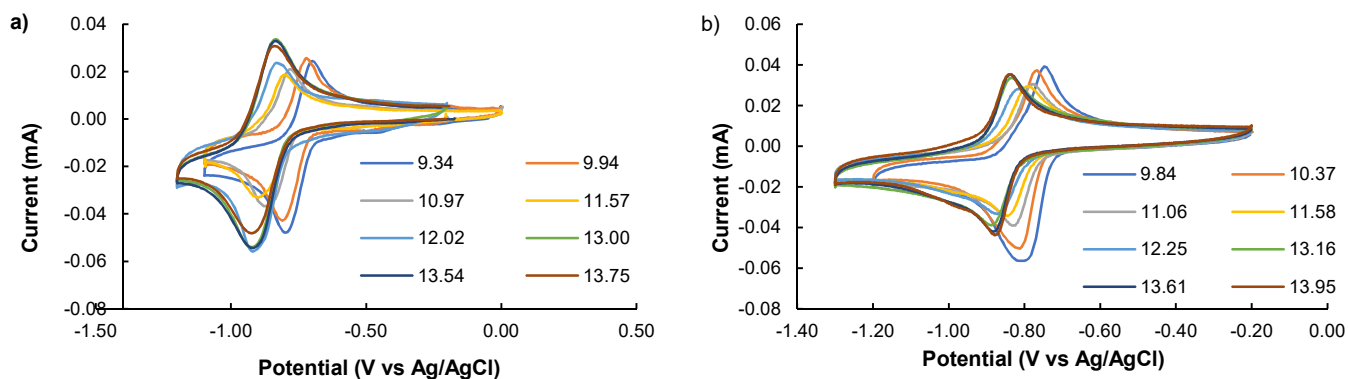


Figure S4 Cyclic voltammetry performed to determine Pourbaix diagram of a) 2,3-DHAQ and b) 1,2-DHAQ.

Electrochemical reversibility

Alan J. Bard *et al.* presented the five criteria defining the reversibility of a redox process in the handbook of electrochemical methods which are the following: i) the peak current absolute values must be proportional to the square root of the scan rate; ii) the peak potentials must be independent at all scan rates; iii) the potential peak difference must be equal to $59/n$, n = number of electron involved in the redox process (2 electrons in this case); iv) the ratio of peak current absolute values must be equal to the unity; v) the apparent standard redox potential must be equal to the half-wave potential. Regarding 2,3-DHAQ, the compound fills most (4 over 5) of theoretical reversibility criteria (Figure S6 and Table 1 in SI).

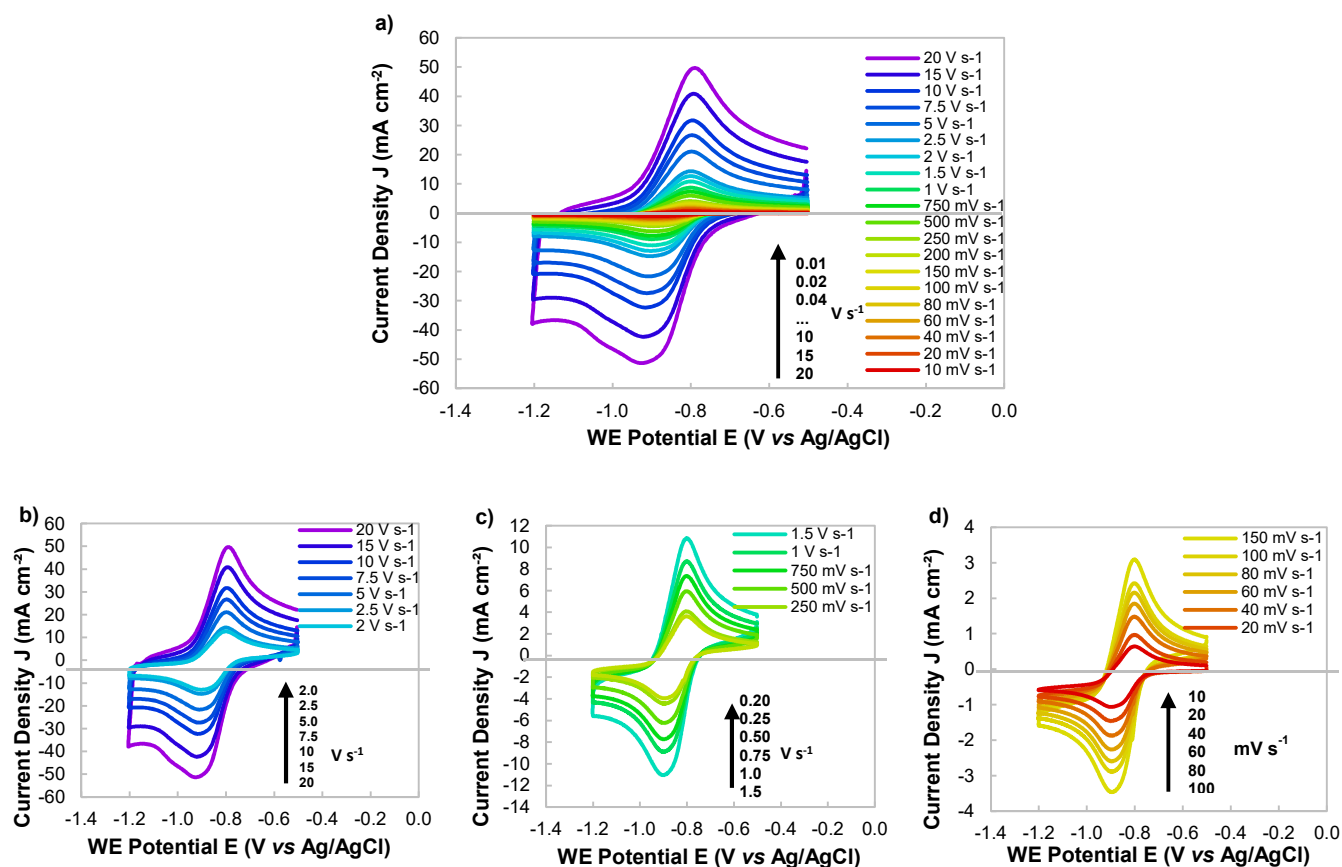
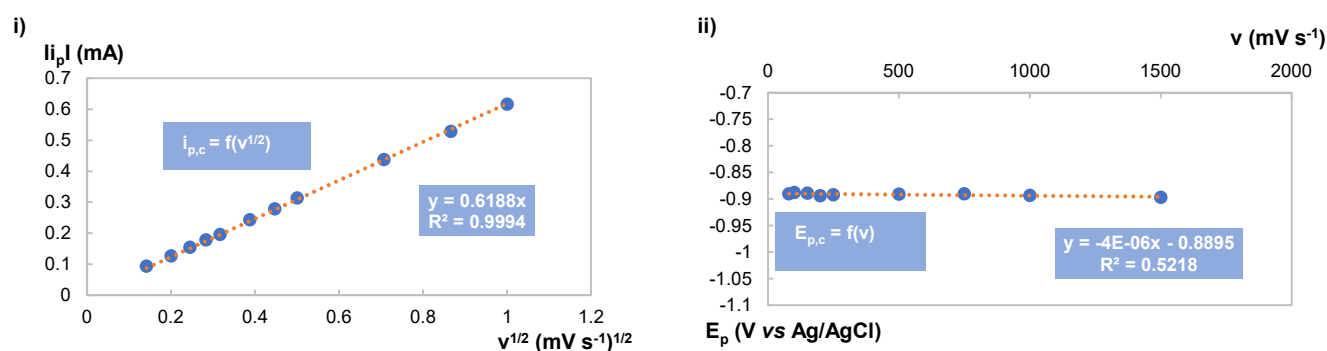


Figure S5 Cyclic voltammetry experiments of 2,3-DHAQ compound at a concentration of 6.3 mM in a KOH 1 M solution (pH 14). Several cycles were performed at faster scan rates (5 cycles from 20 down to 1.0 V s⁻¹; 4 cycles from 0.75 down to 0.20 V s⁻¹; 2 cycles from 0.15 down to 0.04 V s⁻¹ and one cycle at 0.02 and 0.01 V s⁻¹ scan rate) in order to stabilize the electrochemical signal and last cycles were plotted on 4 different graphs in order to give greater visibility of each redox response. In that respect, scan rates ranging from a) 20 down to 0.01 V s⁻¹; b) 20 down to 2.0 V s⁻¹; c) 1.5 down to 0.20 V s⁻¹; d) 0.15 down to 0.01 V s⁻¹ were plotted.



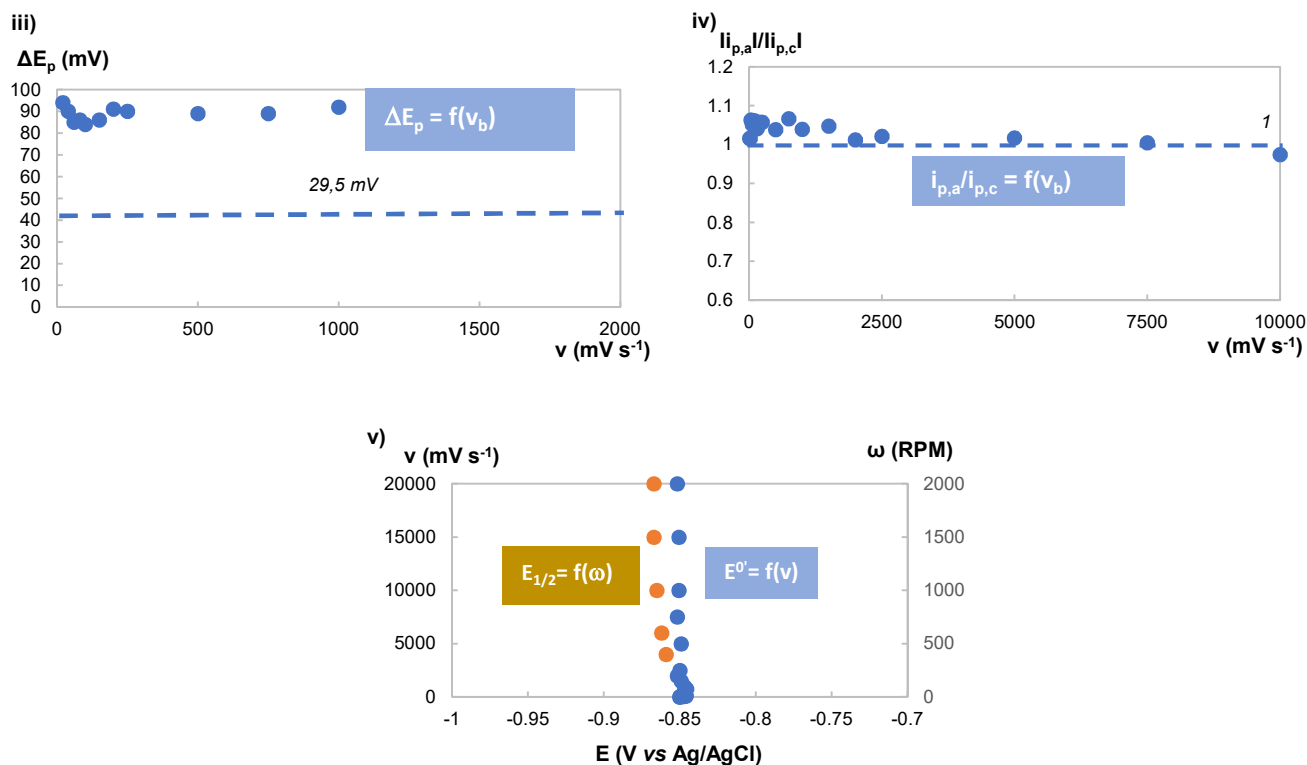


Figure S6 Reversibility criteria evaluation of compound 2,3-DHAQ.

Reversibility criteria	Evaluation	Interpretation	Result
i) $i_{p,c} \propto v^{1/2}$	validated (99.99% correlation)	Reversible	Reversible
ii) $E_{p,c}$ independent from v	validated but slight deviation	Reversible	
iii) $\Delta E_p \approx 59/n$ mV	not validated (88 mV average)	Quasi-reversible	
iv) $i_{p,a}/i_{p,c} = 1$ & independent from v_b	validated (1.04 average)	Reversible	
v) $E^0 \approx E_{1/2}$	validated (by < 15 mV)	Reversible	

Table S1 Reversibility criteria interpretation of 2,3-DHAQ compound.

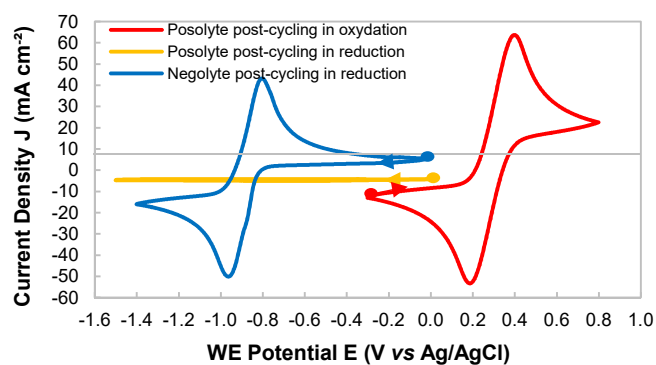


Figure S7 Voltammetry at 100 mV s^{-1} of post-cycling negolyte (blue) in reduction; post-cycling posolyte (red) in oxidation and (orange) in reduction.

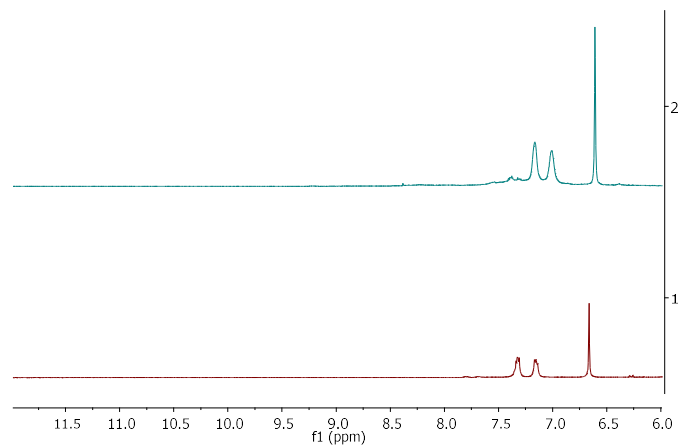


Figure S8 ¹H NMR of the negolyte before (red) and after (blue) 3000 cycles.