

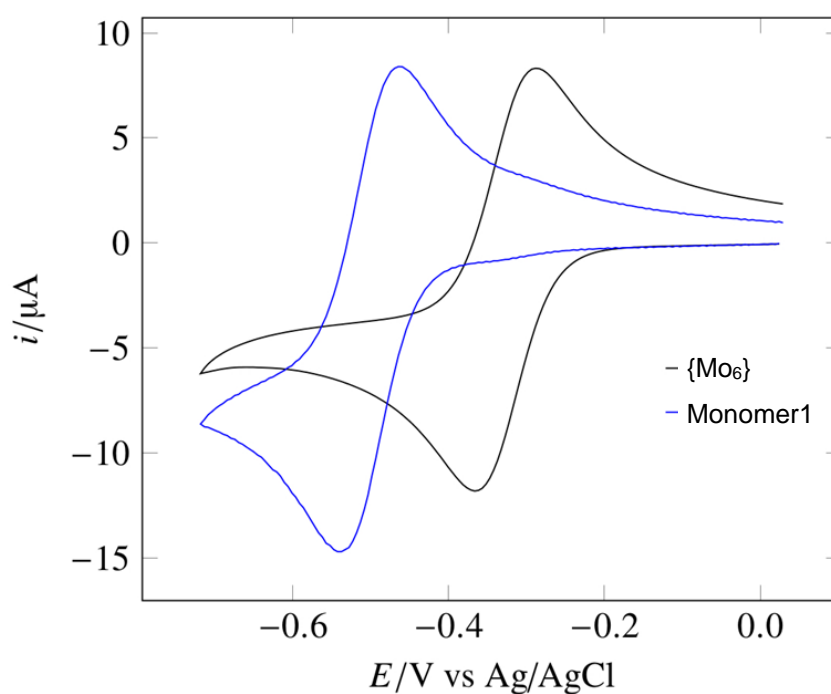
Supporting Information

## Covalently-Linked Polyoxometalate-Polypyrrole

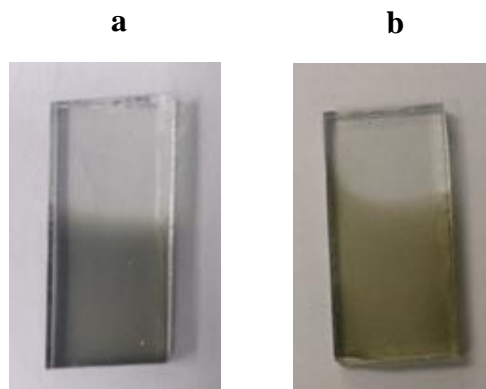
## Hybrids: Electropolymer Materials with Dual Mode

## Enhanced Capacitive Energy Storage

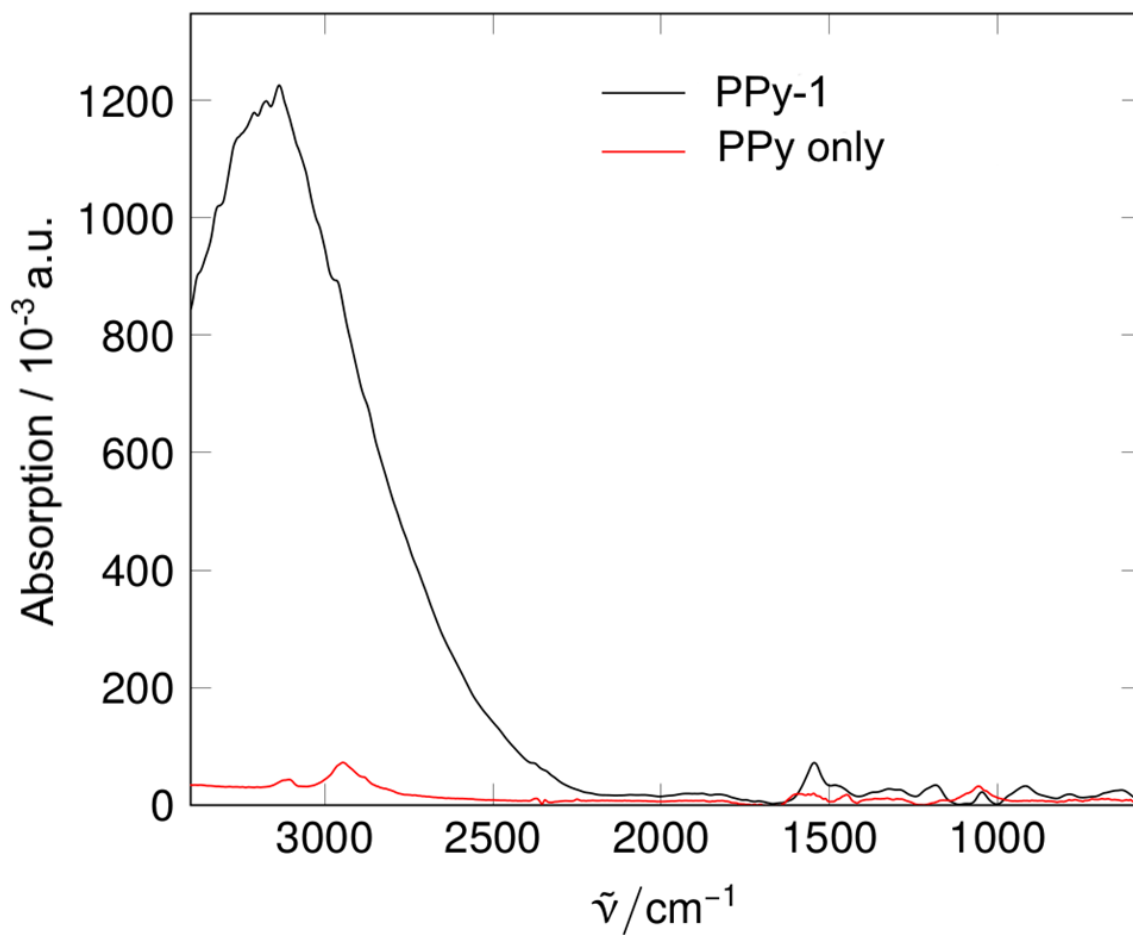
*Sarah A. Alshehri, Ahmed Al-Yasari\*, Frank Marken and John Fielden\**



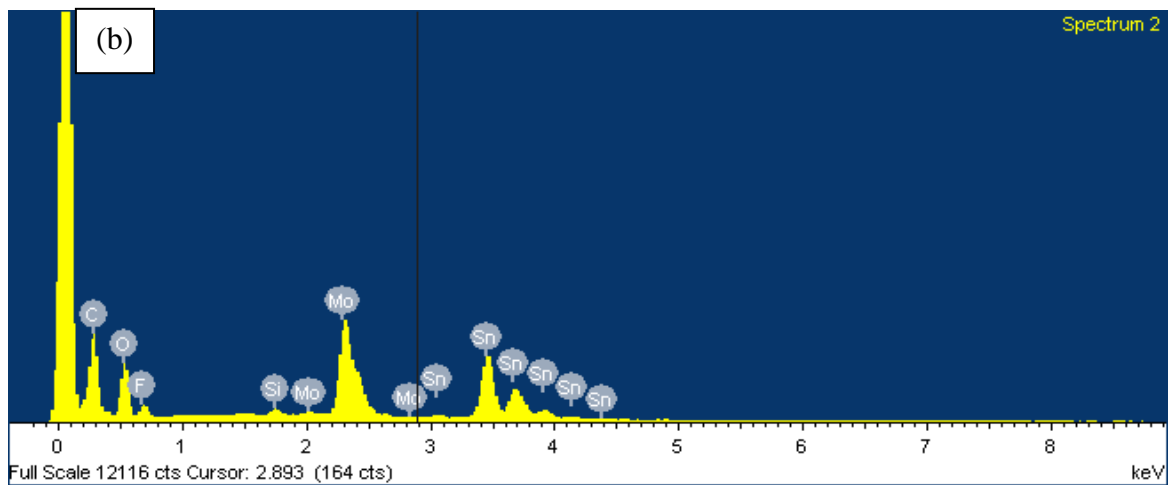
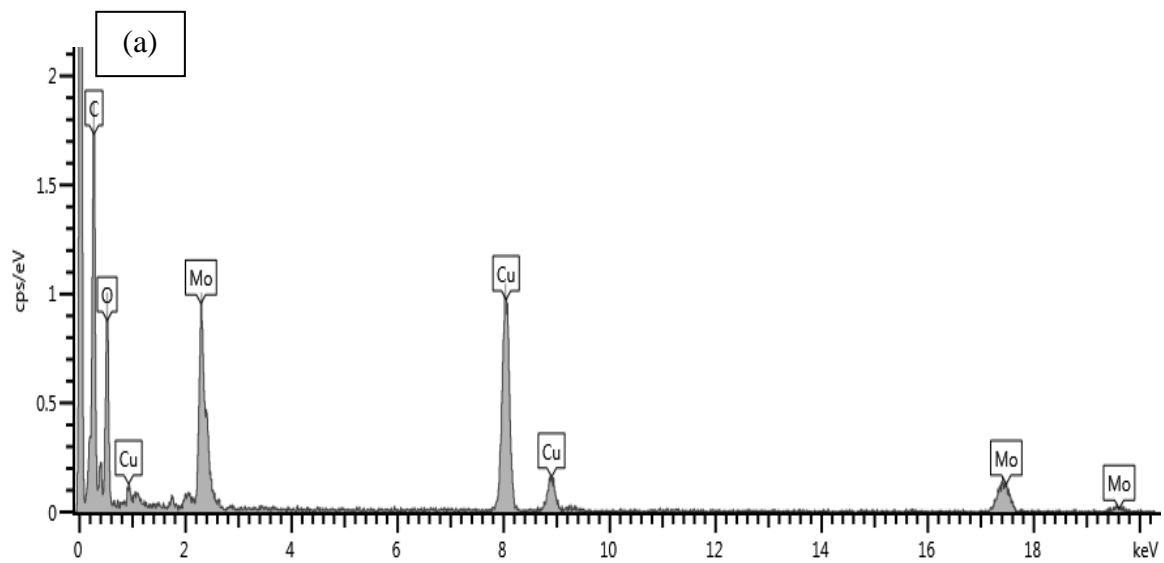
**Figure S1.** CVs of {Mo<sub>6</sub>} (black trace) and monomer1 (blue trace) in 0.1 M [NBu<sub>4</sub>][BF<sub>4</sub>]/MeCN at 25 °C vs Ag/AgCl at scan rate 100 mV/s.



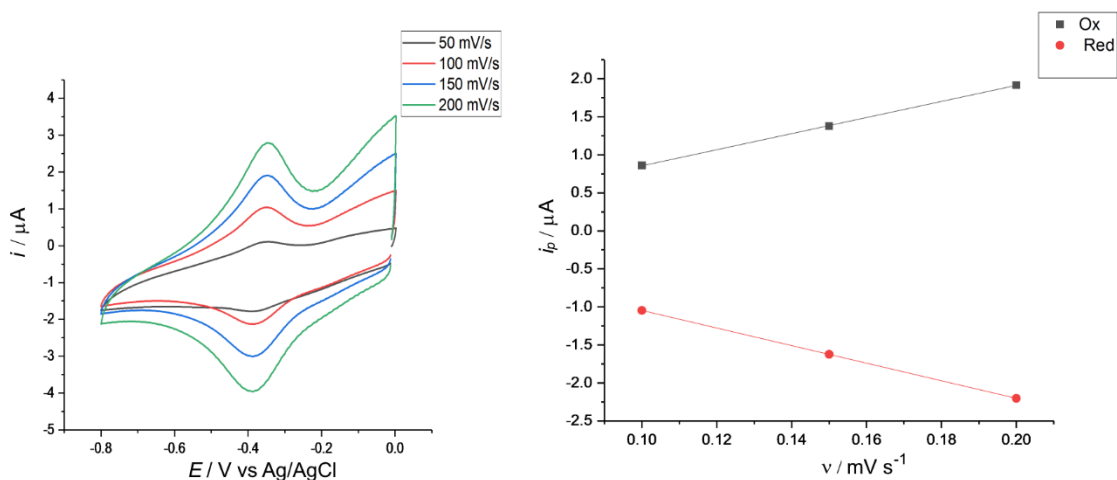
**Figure S2.** FTO electrodes coated with: (a) co-polymer **PPy-1**, and (b) co-polymer **PPy-2**. The colours are obtained for the reduced states of these polymeric films.



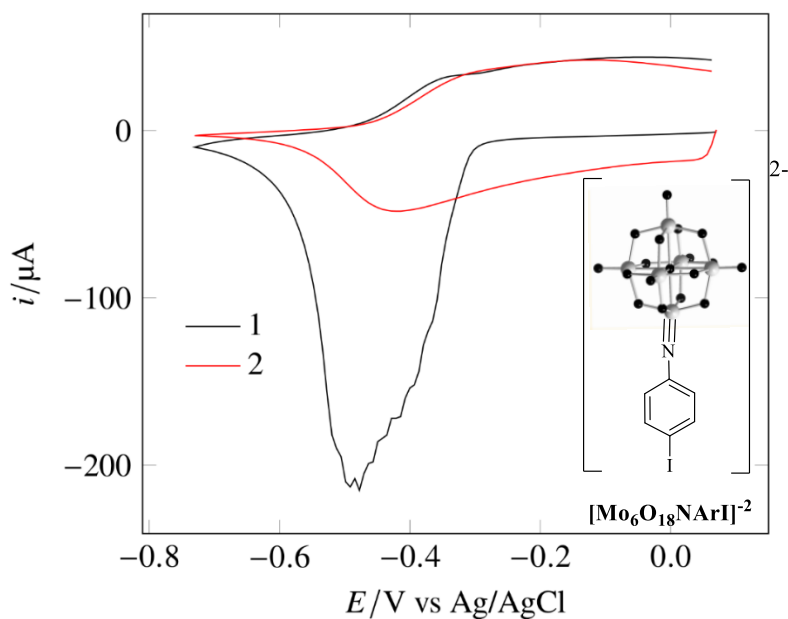
**Figure S3.** FTIR spectra of electrodes coated with the **PPy-1** copolymer (black) and **PPy** (red). The large peak at  $3000\text{ cm}^{-1}$  in **PPy-1** indicates inclusion of tetrabutylammoniums cations.



**Figure S4.** EDX of the cross section of (a) PPy-2 co-polymer at 30:70 % ratio, 10 cycles film thickness (60 nm) and (b) PPy-1 co-polymer at 30:70 % ratio, 10 cycles film thickness.



**Figure S5.** (a) background-Corrected CVs of PPy-1 co-polymer film recorded vs  $\text{Fc}/\text{Fc}^+$  at various scan rates vs Ag/AgCl, and (b) A plot of current peak  $I_{pc}$  vs the scan rates ( $\nu$ ) for reduction of PPy-1 co-polymer film. Electrolyte is 0.1 M  $[\text{NBu}_4][\text{BF}_4]$  in MeCN at 25 °C, scan rate 100 mV/s, working electrode GC of 7 mm<sup>2</sup> surface area.



**Figure S6.** CVs of  $[\text{Mo}_6\text{O}_{18}\text{NArI}]^{2-}$ -PPy inclusion film showing the leaching out of anion after the first redox cycle. Electrolyte is 0.1 M  $[\text{NBu}_4][\text{BF}_4]$  in MeCN, scan rate 100 mV/s, working electrode GC of 7 mm<sup>2</sup> surface area.