

Effect of block copolymer additives for highly active polymeric metal-free oxygen reduction electrode

Samuel R. Pering, James A. Nicholas, Bitu Bayatsarmadi, Drew Evans, Manrico Fabretto, Anton Blencowe, Peter J. Murphy, Pejman Talemi*

(Supporting information)

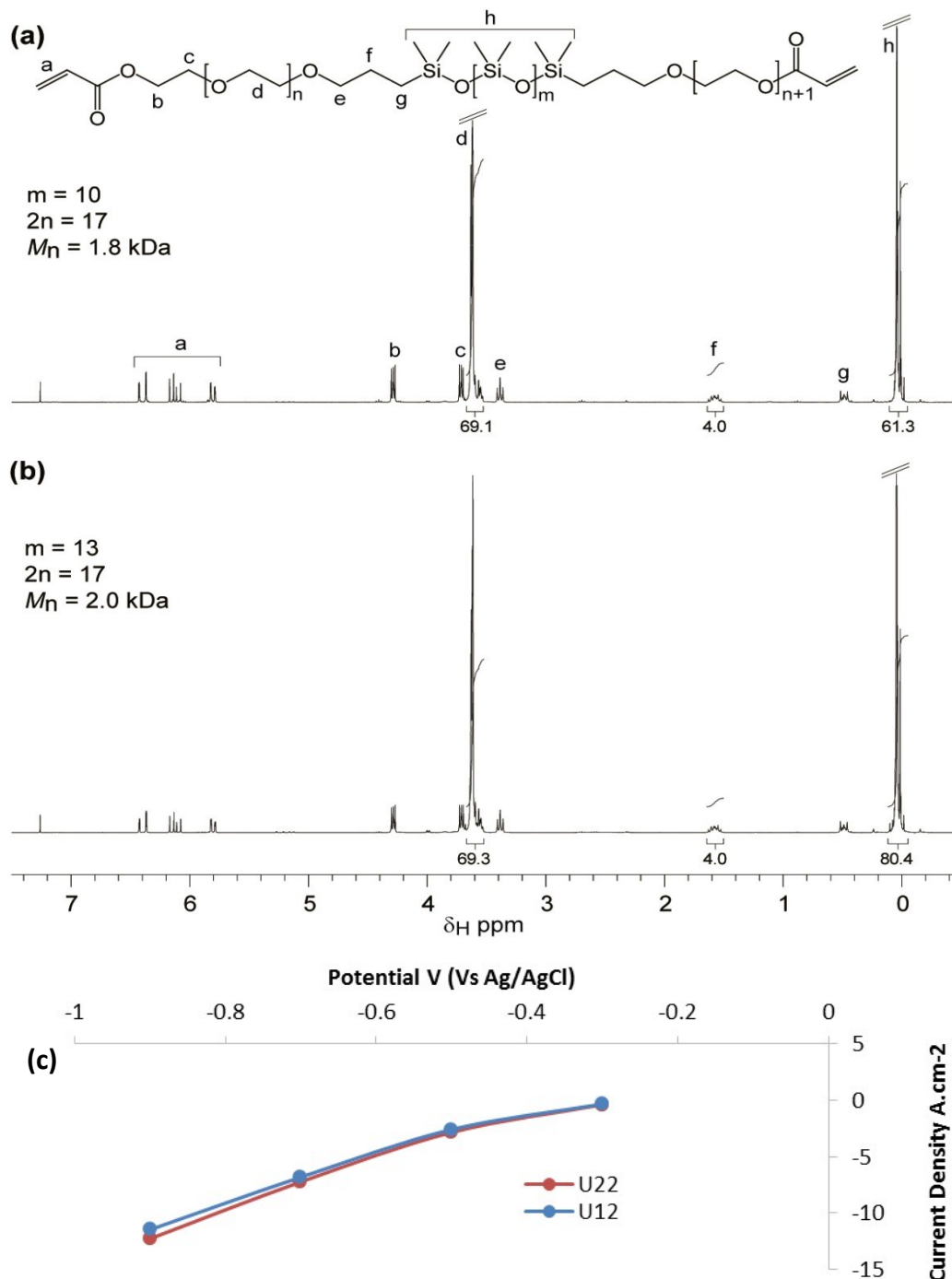


Figure S1. ^1H NMR spectra of commercially available PEG-PDMS-PEG block copolymers supplied from Gelest under the product name of DBE-U12 (a) and DBE-U22 (b) and (c) the ORR performance of S-PEDOT samples based on these two copolymers.

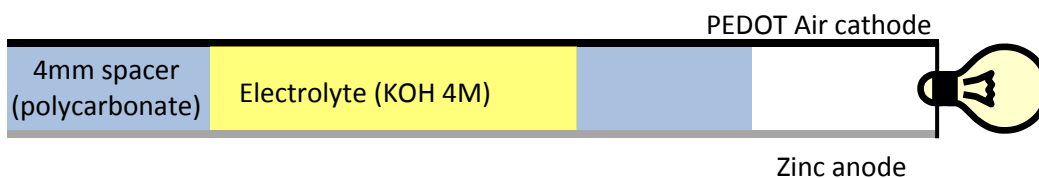


Figure S2. A schematic of the zinc air battery developed in this work.

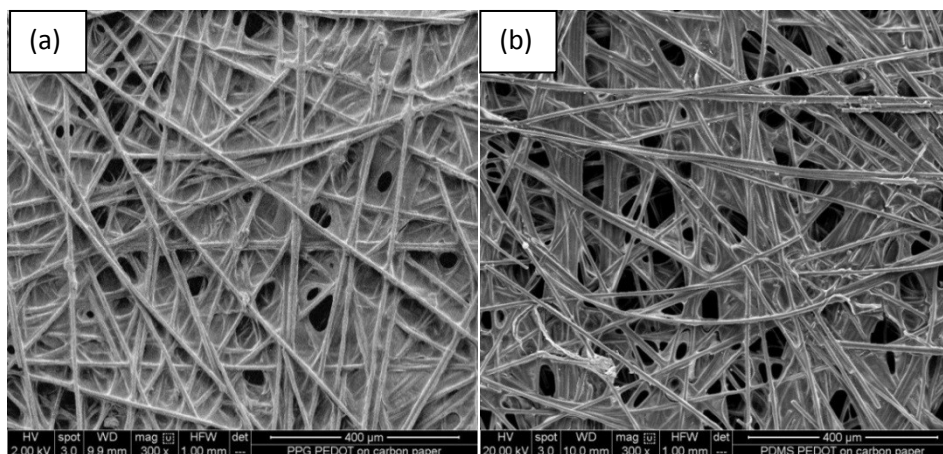


Figure S3. SEM images of (a) EPE-PEDOT and (b) S-PEDOT, both on carbon paper.

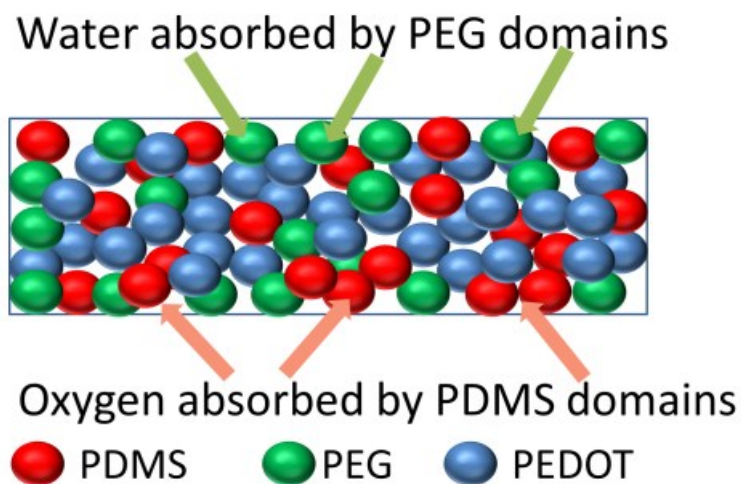


Figure S4. Electrocatalysis on PEDOT electrodes, assisted by oxygen and water absorption through PDMS and PEG domains, respectively.

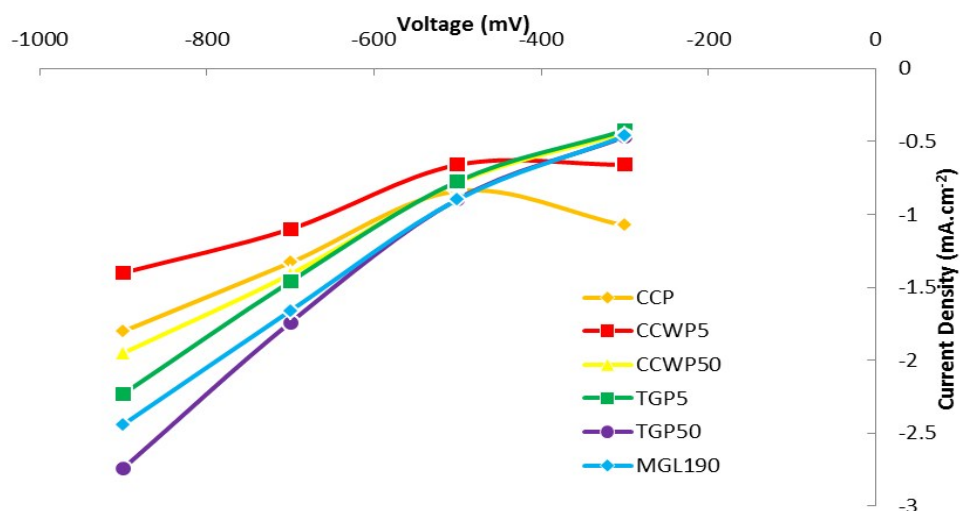


Figure S5. Current density versus voltage in pH 7 buffer solution for 4 layers of S-PEDOT on different carbon supports supplied from Fuel Cell Earth. (CCP: Carbon cloth plain; CCWP5: 5% wet proofed carbon cloth; CCWP50: 50% wet proofed carbon cloth; TGP5: 5% wet proofed carbon paper; TGP50: 50% wet proofed carbon paper; MGL190: activated carbon paper)

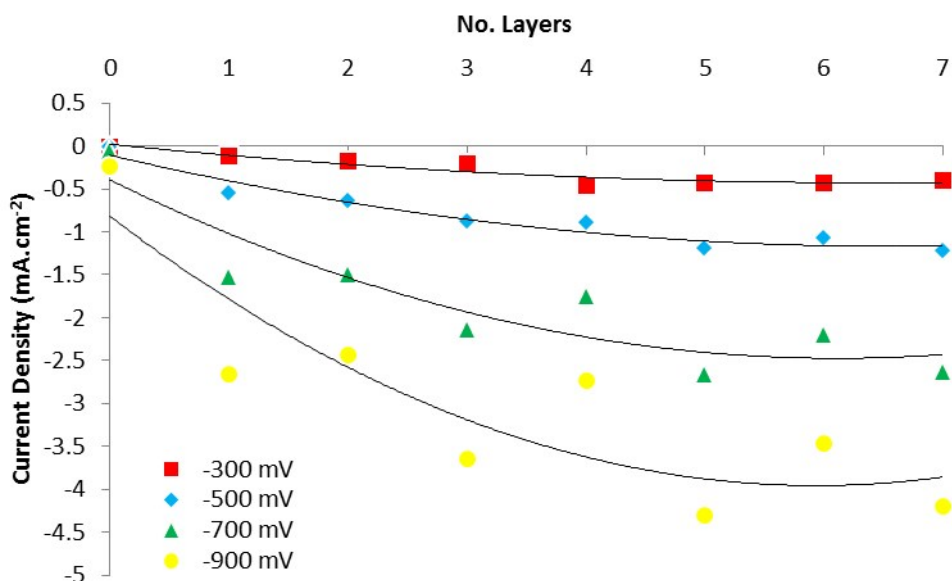


Figure S6. Conversion current density as a function of the number of layers (thickness) of S-PEDOT (pH 7).

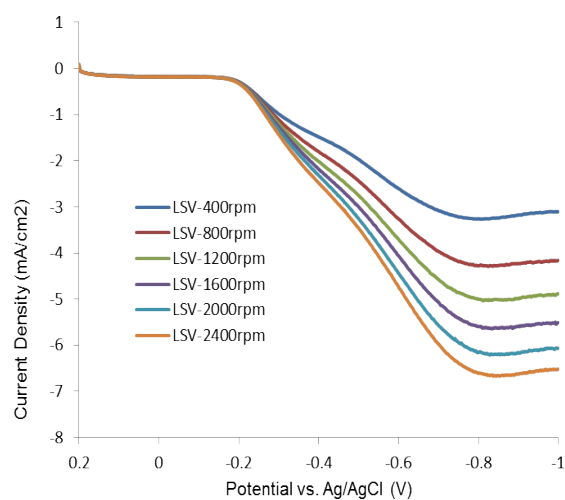


Figure S7. LSV of EPE-PEDOT film in O₂ saturated 0.1KOH at different rotation speed.

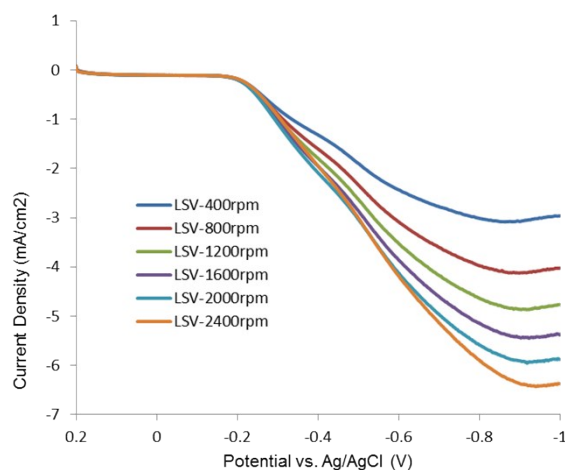


Figure S8. LSV of S-PEDOT film in O₂ saturated 0.1KOH at different rotation speed.

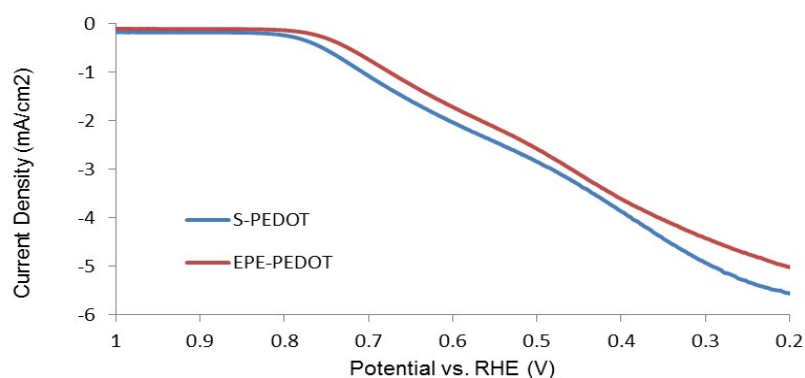


Figure S9. LSV of S-PEDOT and EPE-PEDOT at 1600 rpm indicating a lower over potential for S-PEDOT.

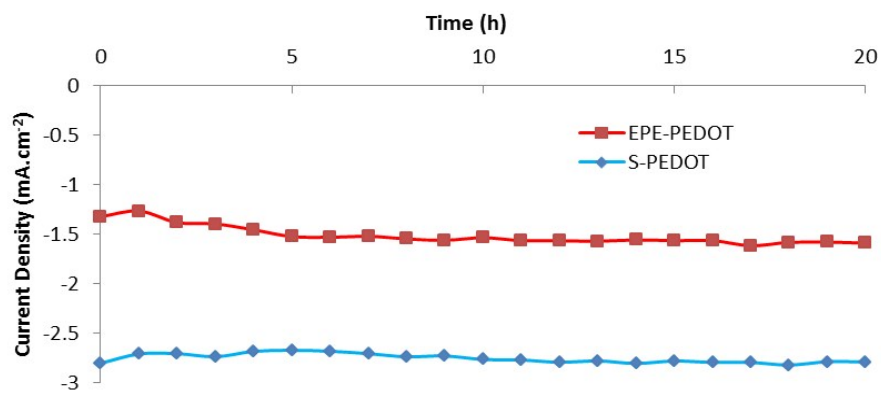


Figure S10. Current density versus time (at -0.5 V vs. Ag/AgCl) over 20 hours for S-PEDOT and EPE-PEDOT.