

Supplementary Information for

A novel solid-state pH sensor for non-aqueous media including ionic liquids

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Contents:

Vapour phase polymerised (VPP) PEDOT film preparation

Figure S-1 Standard curve for Ered of RFN vs cobaltocene

Vapour phase polymerised (VPP) PEDOT film preparation

The following method of trapping the RFN in the network is based on the procedure described by Winther-Jensen *et al.*¹ and Thompson *et al.*² An oxidant solution consisting of 2 mL 40% iron(III) para-toluene sulfonate (Fe(III) PTS) in butanol (Baytron CB-40) with 49.7 μ L pyridine was prepared. A film of approximately 1 mL of the oxidant solution was spin-coated onto a 7 cm x 7 cm piece of the flexible Au-coated mylar substrate at 2000 rpm for 30 seconds. This layer was dried for 1 minute at 70 °C before being placed into a chamber containing a small volume of EDOT monomer pre-heated to 70 °C. The polymerisation was allowed to proceed for 30 minutes before the PEDOT film was removed from the EDOT-containing atmosphere. The film was soaked in a solution consisting of a saturated aqueous RFN solution (1.5g/L) for 30 min twice and washed several times in distilled water. This led to removal of the excess reduced iron from the film, collapse of the expanded structure of the polymer network and trapping of the RFN inside the film. The composite material was dried at room temperature overnight before use in an electrochemical cell.

Standard curve for E_{red} of RFN vs cobaltocene

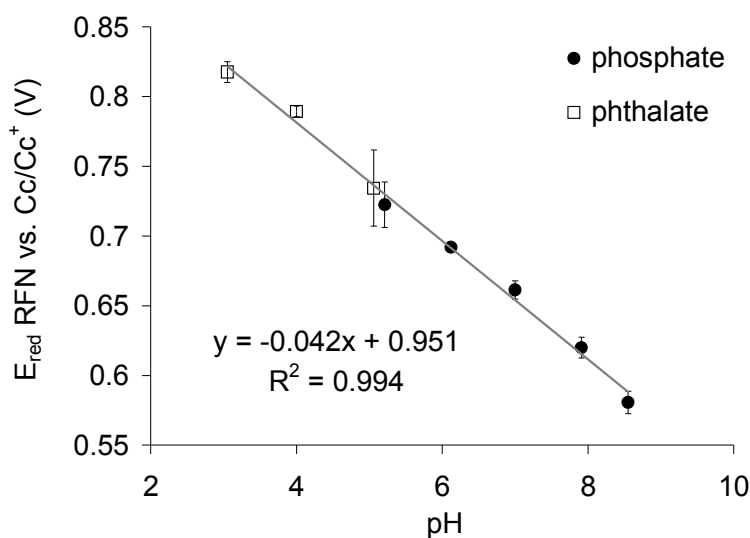


Figure S1 – E_{red} (RFN) in the PEDOT/RFN electrode versus a cobaltocene (Cc) reference redox pair in a range of buffer solutions.

Reference

- 1) Winther-Jensen, B., Chen, J., West, K. & Wallace, G. 'Stuffed' conducting polymers. *Polymer* **46**, 4664-4669, doi:10.1016/j.polymer.2005.03.089 (**2005**)
- 2) Thompson, B. C., Winther-Jensen, O., Vongsvivut, J., Winther-Jensen, B. & MacFarlane, D. R. Conducting Polymer Enzyme Alloys: Electromaterials Exhibiting Direct Electron Transfer. *Macromolecular Rapid Communications* **31**, 1293-1297, doi:10.1002/marc.201000064 (**2010**)