

Carbon Nanotube Stabilised Emulsions for Electrochemical Synthesis of Porous Nanocomposite Coatings of Poly[3,4-ethylene-dioxythiophene]

Supporting Information

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Further work on mixing CNTs with other organic solvent and water

The formation of CNT supported metastable organoaqueous mixture or emulsion was further tested by replacing EDOT with toluene. It was found that sonication of 5 ml toluene and 5 ml aqueous suspension of 0.3 wt % CNT could not remove phase separation,^{4d} whereas a visually uniform mixture was produced from 0.5 ml toluene with about 9 ml CNT suspension (with or without adding 0.5~1 ml acetonitrile) in the ultrasonic bath. After the mixture stood still for a few tens of seconds (while the mixture remained visually uniform), absorbing the top part of the visually uniform toluene-CNT-(acetonitrile)-water mixture into a pipette with a 2 cm capillary tip, and squeezing out the liquid gently, the last part of the liquid entering and flowing through the capillary was clear, indicative of phase separation. However, the same was not observed when applying the capillary test to the visually uniform CNT-water-EDOT-acetonitrile mixture.

Energy dispersive X-ray spectrometry

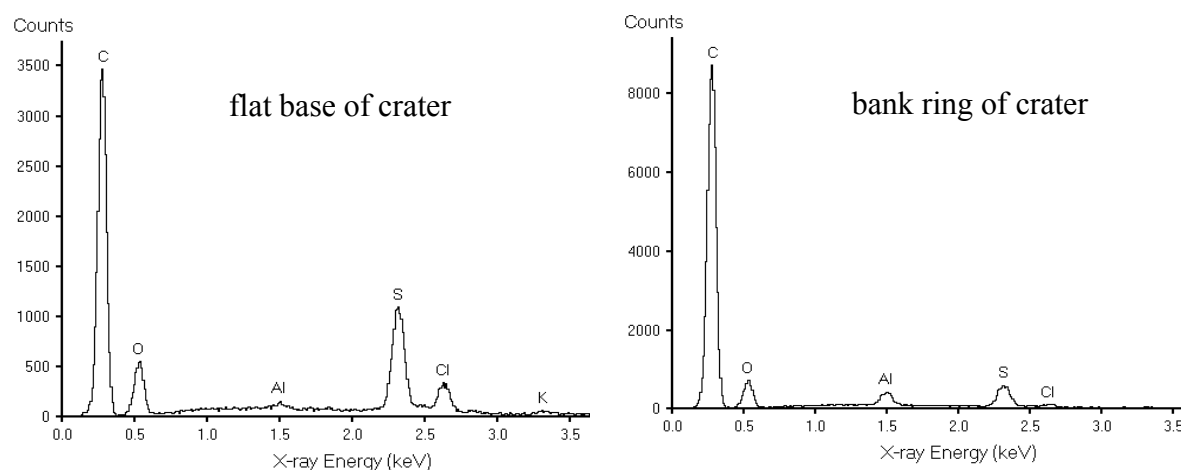


Fig. S1. Energy dispersive X-ray spectra measured at the flat base (left) and the bank ring (right) (c.f. **Fig. 1b** and **1c** in the main text, respectively) on the surface of an electrochemically grown coating of PEDOT/CNT that was partially oxidised in the 0.5 mol L⁻¹ KCl aqueous solution, and then rinsed in water. An aluminium sample holder was used in the EDX measurements.

Infrared Spectrometry

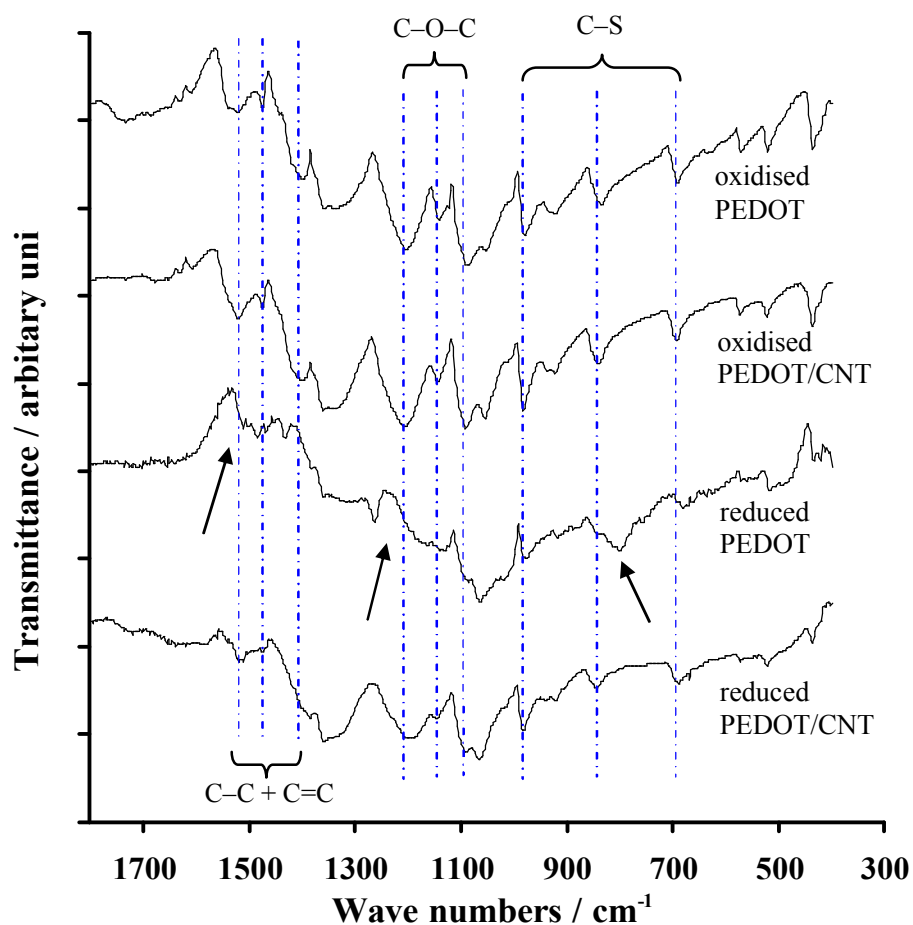


Fig. S2. Infra red spectra of oxidised (1.0 V vs. Ag/AgCl) and reduced (−0.5 V) electrochemically grown coatings of PEDOT and PEDOT/CNT (Ref: K. I. Seo, I. J. Chung, *Polymer*, 2000, **41**, 4491).