

**Studies on the heterogeneous electron transport and oxygen reduction reaction at metal (Co, Fe) octabutylsulphonylphthalocyanines supported on multi-walled carbon nanotube modified graphite electrode**

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**ABSTRACT**

Heterogeneous electron transfer dynamics and oxygen reduction reaction (ORR) activities using octabutylsulphonylphthalocyanine complexes of iron (FeOBSPc) and cobalt (CoOBSPc) supported on multi-walled carbon nanotube (MWCNT) platforms have been described. The MWCNT-based electrodes (MWCNT–CoOBSPc and MWCNT–FeOBSPc) showed larger Faradaic current responses than the electrodes without the MWCNTs, interpreted as a consequence of the trapped electrolyte species within the porous layers of MWCNTs undergoing a redox process. The EPPGE–MWCNT–FeOBSPc showed onset potential (–0.01V vs Ag|AgCl) which is comparable and even much lower than recent reports. The MWCNT–FeOBSPc showed the best ORR activity involving a direct 4-electron mechanism, with a Tafel slope of about 124 mV, indicating a 1-electron process in the rate-determining step.