Supporting Information for

Buckycolumn electrodes: an improved alternative to conventional materials utilised for biological electrochemical monitoring

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Experimental Section

Fabrication of CNT-based BC electrodes: The fabrication of the BC material has been described elsewhere[21]. Briefly, MWCNT (Supplied by "TMSpetsmash"20-30 nm diameter, >> 1 μm length) nanotubes were dispersed in methanol to disaggregate the CNTs, poured between two polyethylene frits, compressed to remove the solvent and then dried in air. For the construction of the electrode, the BC material was attached to a copper wire using silver epoxy. This entire piece was then encased in epoxy resin to provide a solid device for ease of use. Following this the electrochemically active surface as exposed by cutting using a diamond wafer blade (Buehler saw) Following preparation of the BC electrode, it was stored in 1 M KCl.

Electrochemical Measurements: All electrochemical experiments were carried out using a CHI 630B potentiostat (CHI Instruments, Austin, Texas, USA). A three electrode setup was employed for all electrochemical studies using a platinum wire counter electrode and an Ag|AgCl (3 M KCl) reference electrode. The working electrode was either a boron-doped diamond (BDD) electrode (Winsor scientific LTD, diameter 3mm, boron doping level: ≈0.1%, resistivity: 7.5x10-4 Ωm), a glassy carbon (GC) electrode (CHI Instruments, Austin, Texas, USA, diameter 3mm) or a CNT-based BC electrode described in section 2.2. Prior to electrochemical studies, the commercial electrodes were polished for 5 minutes with 0.05μm grade alumina aqueous slurry; this procedure was carried out before each experimental run. For fouling studies measurements were carried out in 1 mM dopamine in 0.1 M PBS buffer at

a scan rate of 100 mV s^{-1}, after an initial unstable period of fouling for approximately 2 minutes the system entered a more stable region where analysis was performed. Additional fouling experiments were carried out to observe effects of 5 % bovine serum albumin on electrode performance.

Data analysis: Electrochemical data analysis was carried out using the CHI 630B software. Electrochemical characteristics, peak current and peak potential were measured from the experimental data and compared between the three electrodes. The effective surface area of all electrodes was calculated from the oxidation peak current of 1 mM potassium ferricyanide in 1 M KCl through the Randles-Sevick equation. For fouling studies, a 2-way ANOVA analysis was utilised to compare the performance of the three electrodes

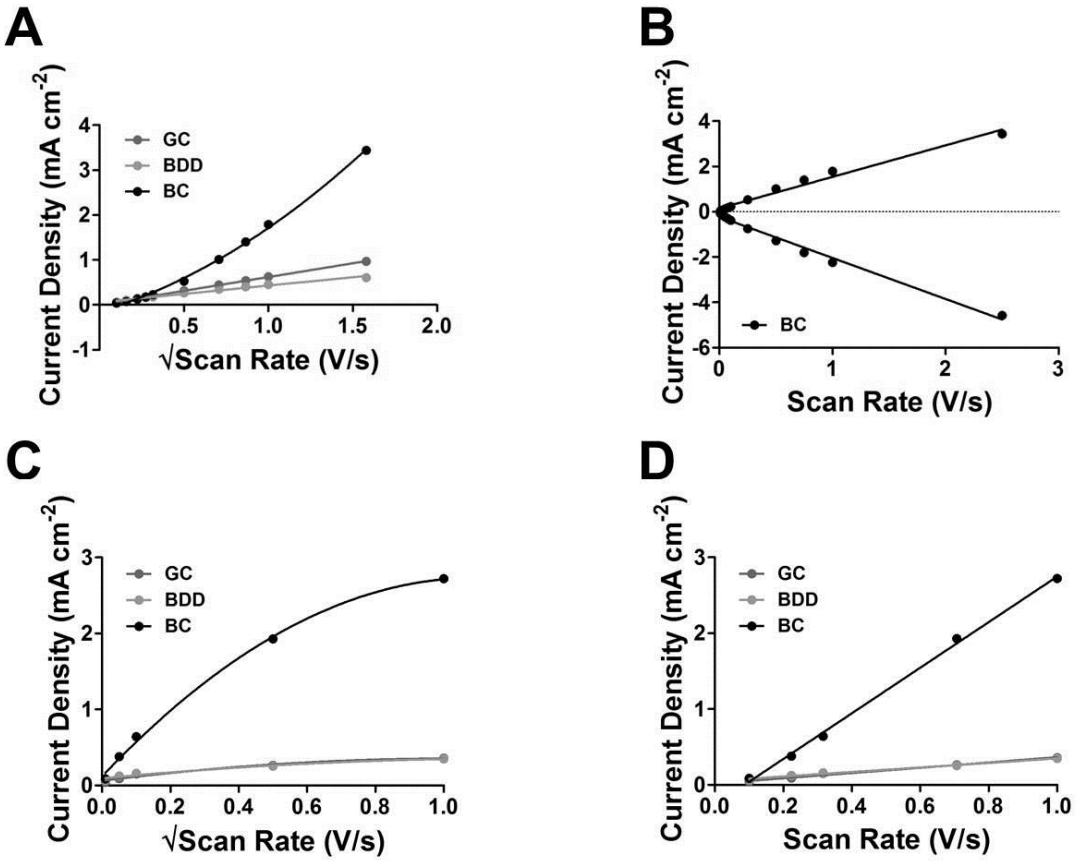

Fig. S1. The dependence of the anodic peak current for ferrocyanide and dopamine were investigated against scan rate and square root of scan rate. Responses for ferrocyanide are shown in (a) and (b) and the responses for dopamine are shown in (c and d). All data shown as the mean ± S.E.M., n =3.