Electronic Supplementary Material (ESI) for New Journal of Chemistry.

Supplementary Information

Carbon nanotubes-modified conductive ink for application to paper-based electrochemical biosensor for pathogenic DNA detection

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S1. Immobilization of avidin on carboxylated magnetic beads

The manufacturer's protocol was followed for the immobilization of avidin on carboxylated magnetic beads (MBs) with slight modifications. Briefly, 10 mg of beads were first taken and washed with 0.1 M NaOH for 10 min (3×). This was followed by washing with double distilled water (3×) by slow tilt rotation. Thereafter, freshly prepared solutions of EDC (50 µg mL^{-1}) and NHS (150 µg mL^{-1}) were added to the MBs to a final volume of 100 µL. The beads were then incubated at room temperature (25 °C) for 30 min on slow tilt rotation. These activated beads were then washed with double distilled water (1 mL; 3×) to remove any unreacted and extra EDC/NHS. Avidin was then added to the beads (50 µg avidin per mg of beads) and the volume was made up to 100 µl by double distilled water. This mixture was allowed to incubate at room temperature for 2 h to yield MBs covalently linked with avidin via amide bond formation. Thus formed Av/MBs complexes were stored at 4 °C till further use.

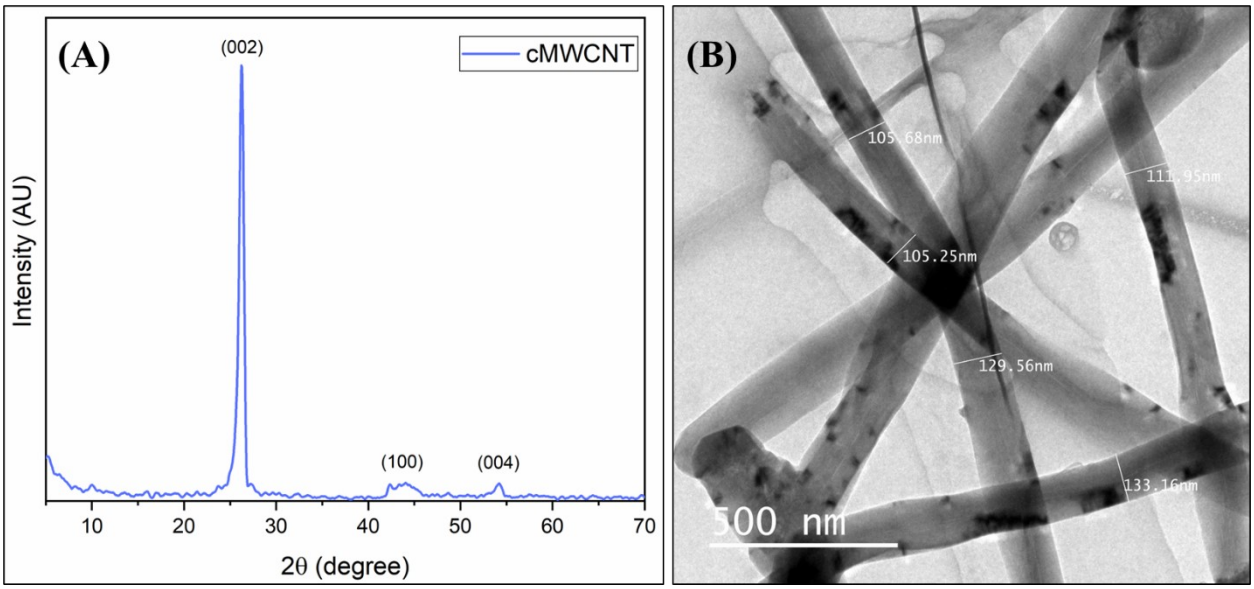

Figure S1. (A) XRD spectrum, and **(B)** TEM image of the cMWCNTs used in the formulation of conductive ink.

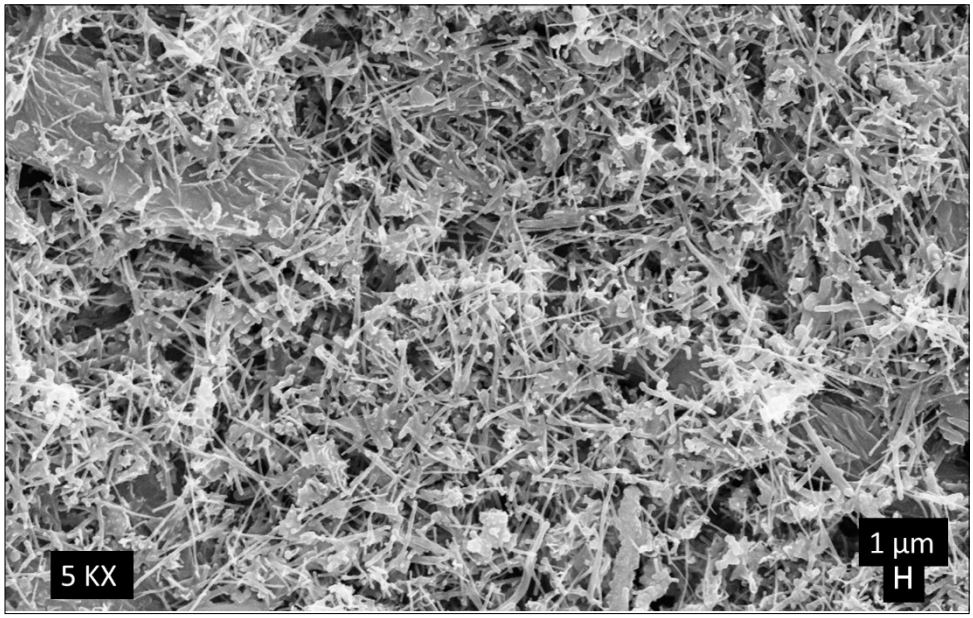

Figure S2. SEM image of paper modified with cMWCNT dispersed in PS80.

Video_Paper conductivity.mp4

S2. Video showing the use of the cMWCNT@paper electrodes to light a red LED and demonstrating their conductivity

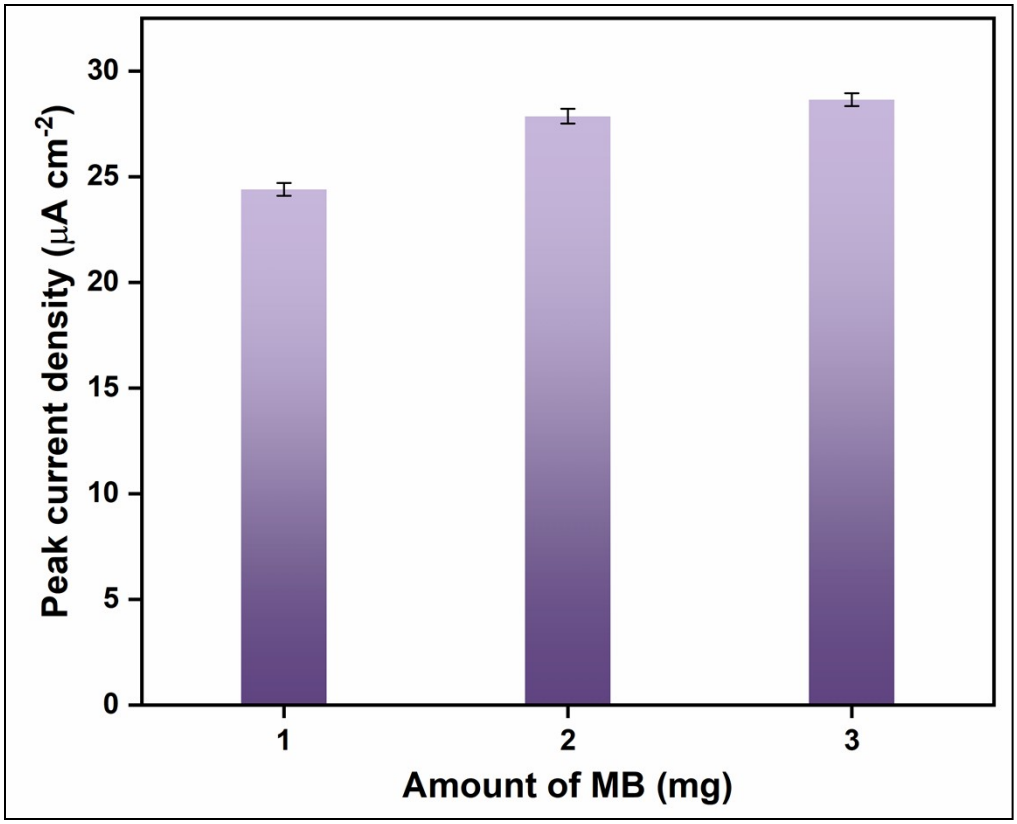

Figure S3. Peak current response of the C-T-D/Av/MB/cMWCNT@paper electrodes with respect to different amounts of MB.

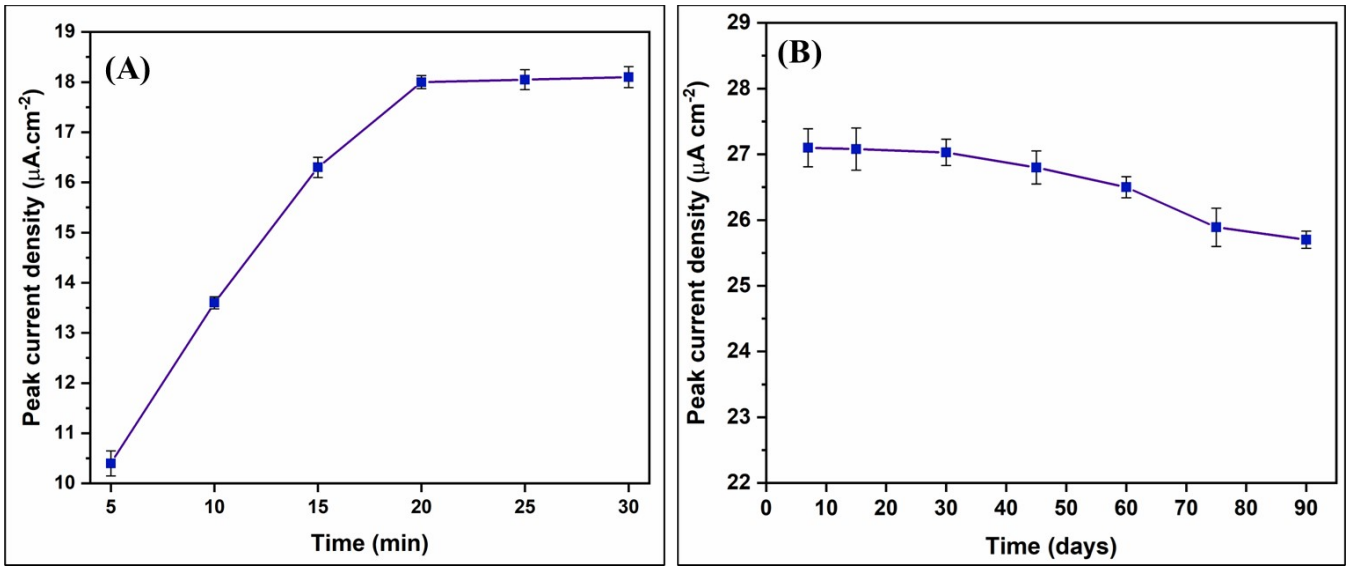

Figure S4. (A) The peak current density of the C-T-D/Av/MB/cMWCNT@paper electrode for 1 pM target concentration (*porA* TP) with time, and **(B)** the peak current density of the cMWCNT@paper electrodes over a period (7-90 days) indicating storage stability.