Electronic Supplementary Material (ESI) for Analyst.

**Electrochemical treatment in KOH improves carbon nanomaterial performance to multiple neurochemicals**

Samuel M. Hanser, Zijun Shao, He Zhao, B. Jill Venton *

## Supplemental Figures

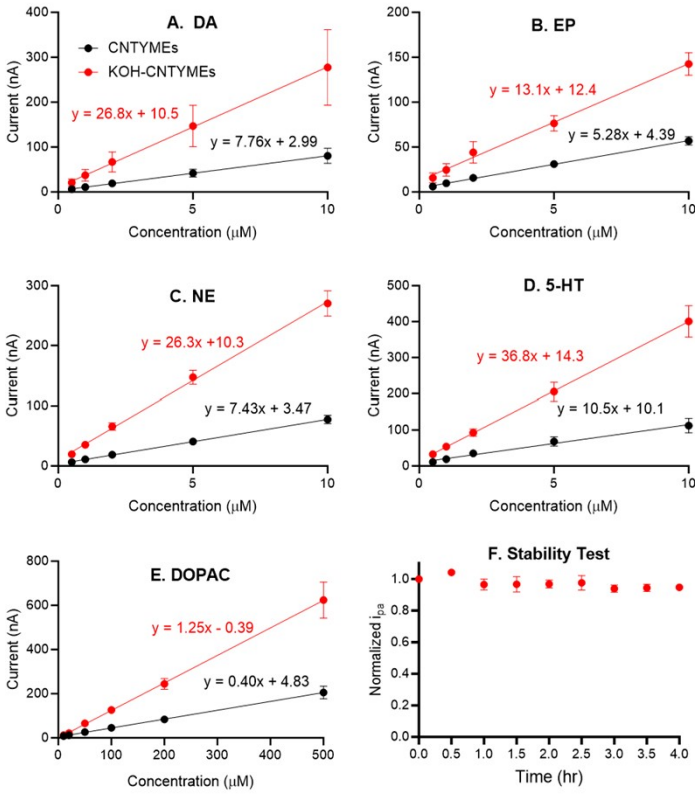


Fig. S1 – Electrode response for neurotransmitter concentrations and stability test. Calibration curves were generated for relevant physiological concentrations of **A.** DA, **B.** EP, **C.** NE, **D.** 5-HT, **E.** DOPAC on an untreated (black) and 1-minute KOH treated (red) CNTYME. **F.** Stability test of the 1-minute treated CNTYME. Signal for 1 μM DA signal every 0.5 hours for 4 hours after treatment.

To determine a CNTYME's sensitivity to multiple concentrations of analytes, calibration curves were generated for the electrode pre and post treatment. It was observed that for dopamine, epinephrine, norepinephrine, and serotonin, current is linear to concentration from 1

to 10 μM on both a treated and untreated electrode. The same case is true for DOPAC from 1 to 500 μM. Higher concentrations for DOPAC were tested because its anionic nature would repel the electrode at a negative holding potential. The treated electrodes were more sensitive than the untreated ones because at the same concentration, a higher current was detected. The slopes of the KOH-treated curves observe a 2.5- to 3.5-fold increase from those of the untreated electrodes. This indicates that the treated electrodes are more sensitive and more efficiently adsorbed analyte molecules for a wide range of relevant physiological concentrations. For the electrochemical tests, 1 μM was chosen for DA, EP, NE, and 5-HT, and 20 μM for DOPAC, but these calibraiton curves demonstrate that a 1-minute KOH treated CNTYME will effectively detect a range of analyte concentrations.

The treatment provides improved electrode sensitivity for a long duration of time post-treatment. 1 μM DA was injected once every 0.5 hours for 4 hours after treatment to determine the duration of effective treatment. Normalized to the current detected at the start, after 4 hours, the signal does not noticeably decrease.