

Figure S1. Schematic of the experimental setup of the in-house-built potentiostat. ADC: analog to

digital converter; BUF: buffer; CE: counter electrode; CF: amplifier feedback capacitor; G: amplifier gain; ID: inner diameter; ISENS: sensed current; OD: outer diameter; PI: proportional integrator electronic circuit; RC: low-pass filter resistor; RE: reference electrode; RF: amplifier feedback resistor; RI: amplifier integrator resistor; RSH: pull down resistor; R_{shunt} : shunt resistor; SP: buffer used to insulate the input from the electronic circuit; SUB: subtractor amplifier; V_{sig} : actuation/stimulation signal; WE: working electrode.

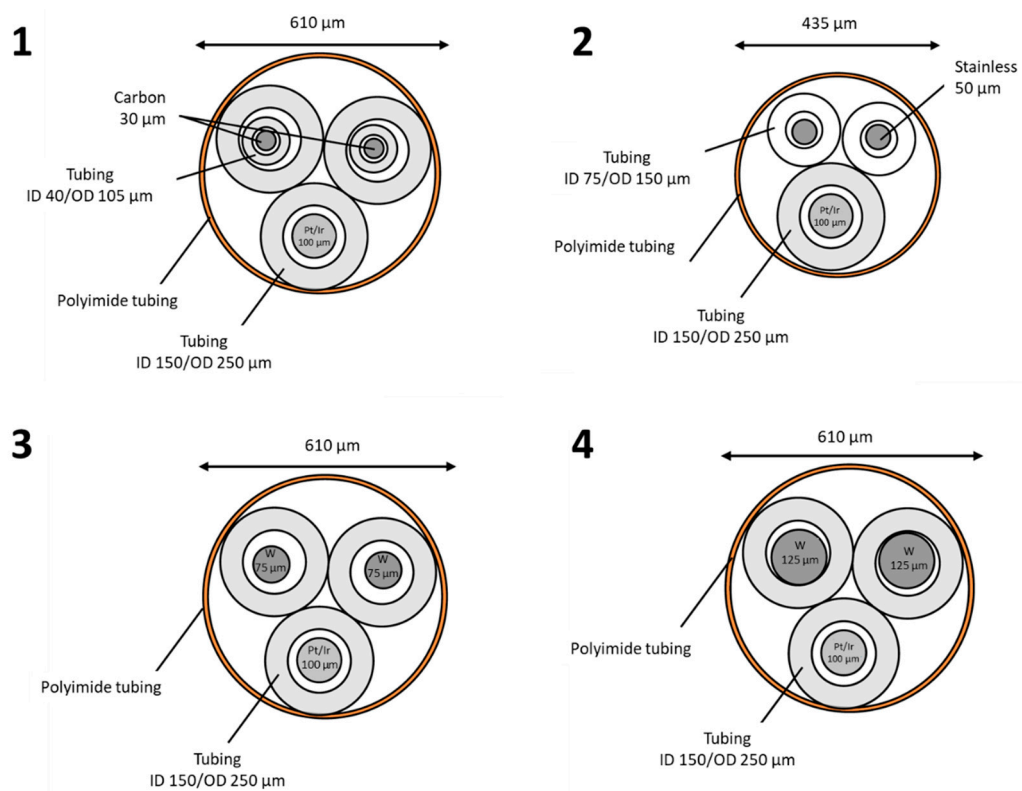


Figure S2. Geometry of the triple electrodes. 1: carbon triple electrode; 2: stainless triple electrode; 3: tungsten 75 triple electrode; 4: tungsten 125 triple electrode; ID: inner diameter; OD: outer diameter.

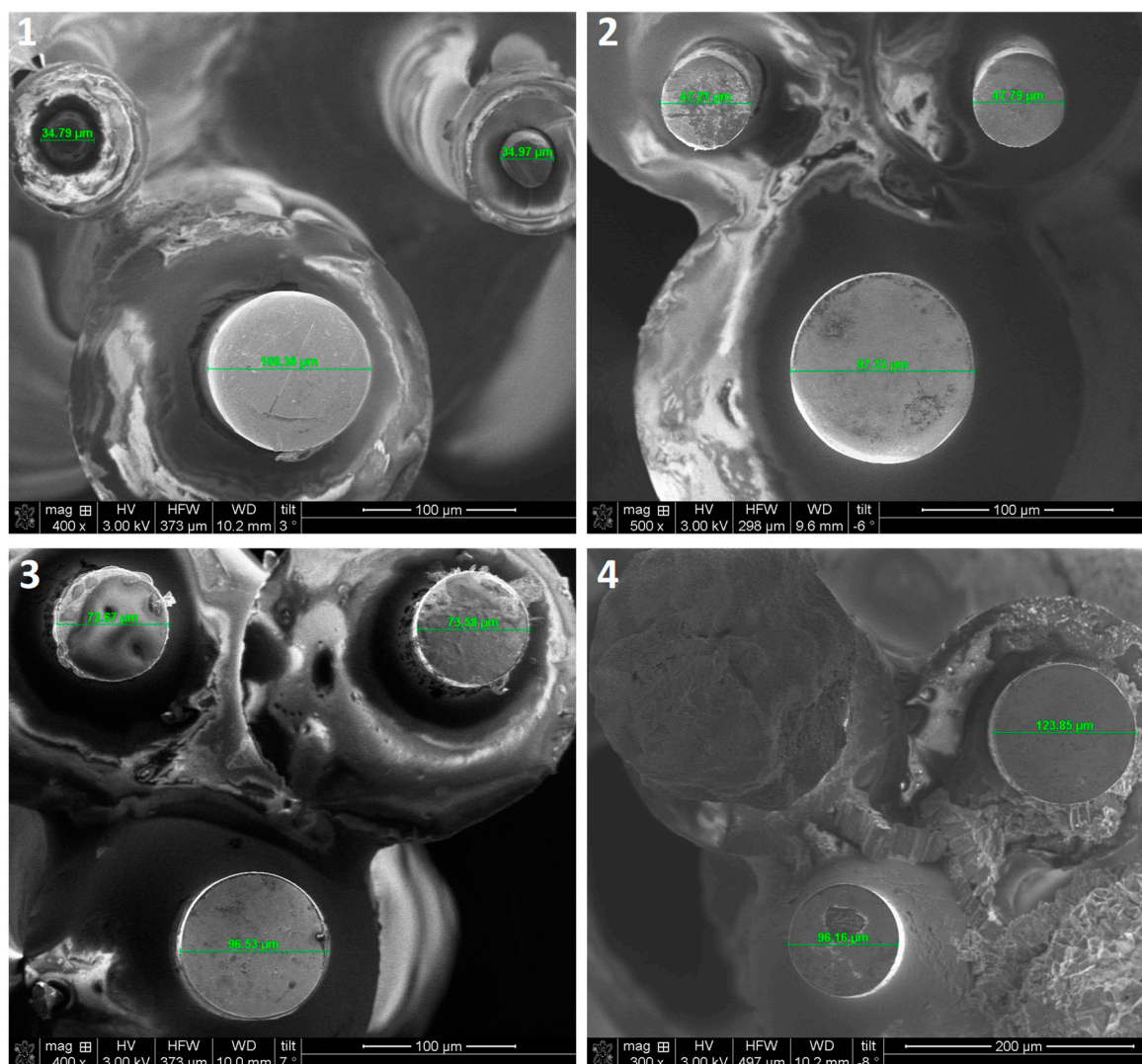


Figure S3. SEM images of the triple electrodes. 1: Carbon triple electrode; 2: Stainless triple electrode; 3: Tungsten 75 triple electrode; 4: Tungsten 125 triple electrode.

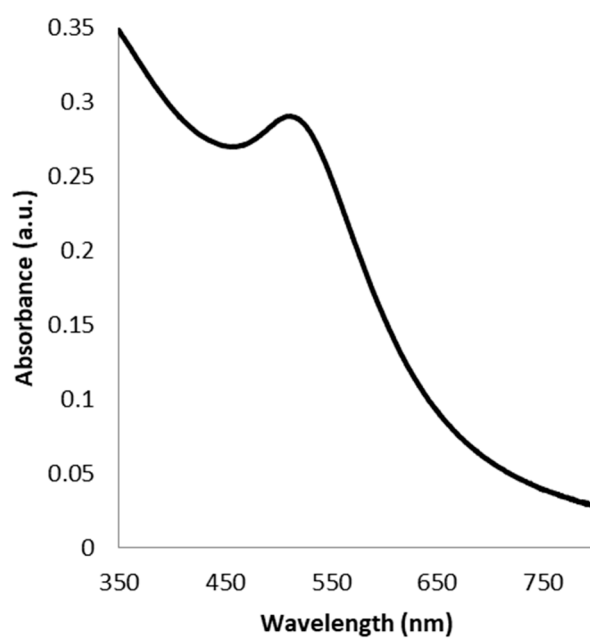


Figure S4. UV-visible spectrum of gold nanoparticles.

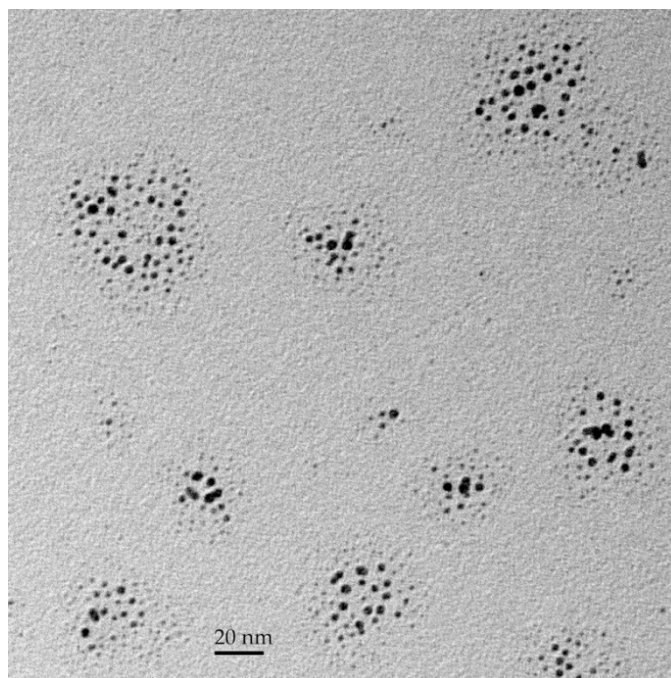


Figure S5. Transmission electron microscopy image of gold nanoparticles.

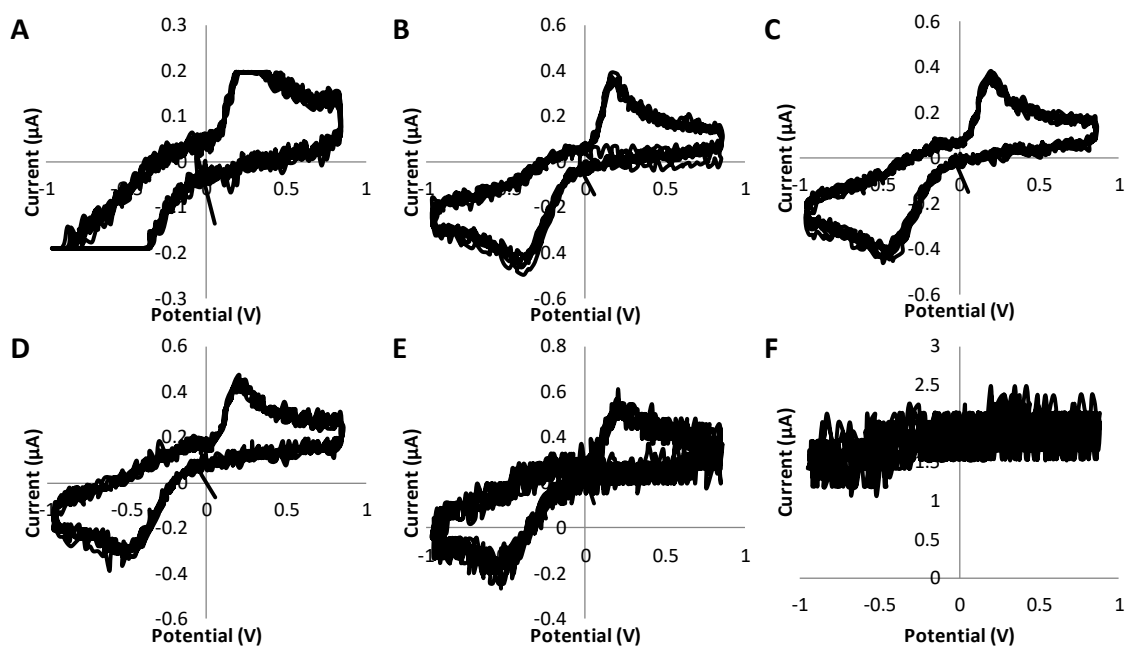


Figure S6. Voltammograms obtained for 10 mM dopamine using the carbon triple electrode with the in-house-built potentiostat. The values of the maximal sensed current are A) 0.1 μA ; B) 0.5 μA ; C) 1 μA ; D) 5 μA ; E) 10 μA and F) 50 μA .

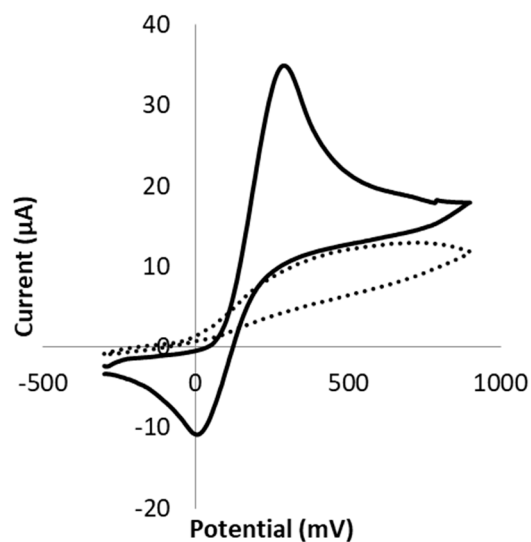


Figure S7. Voltammograms obtained for the analysis of 1 mM dopamine (solid black) and 1 mM ascorbic acid (dotted) for a commercial electrode functionalized with 0.01% m/V HAuCl_4 (in situ formation of gold nanoparticles).



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