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# Synthesis of $La_2O_3$/MWCNT Nanocomposite as the Sensing Element for Electrochemical Determination of Theophylline

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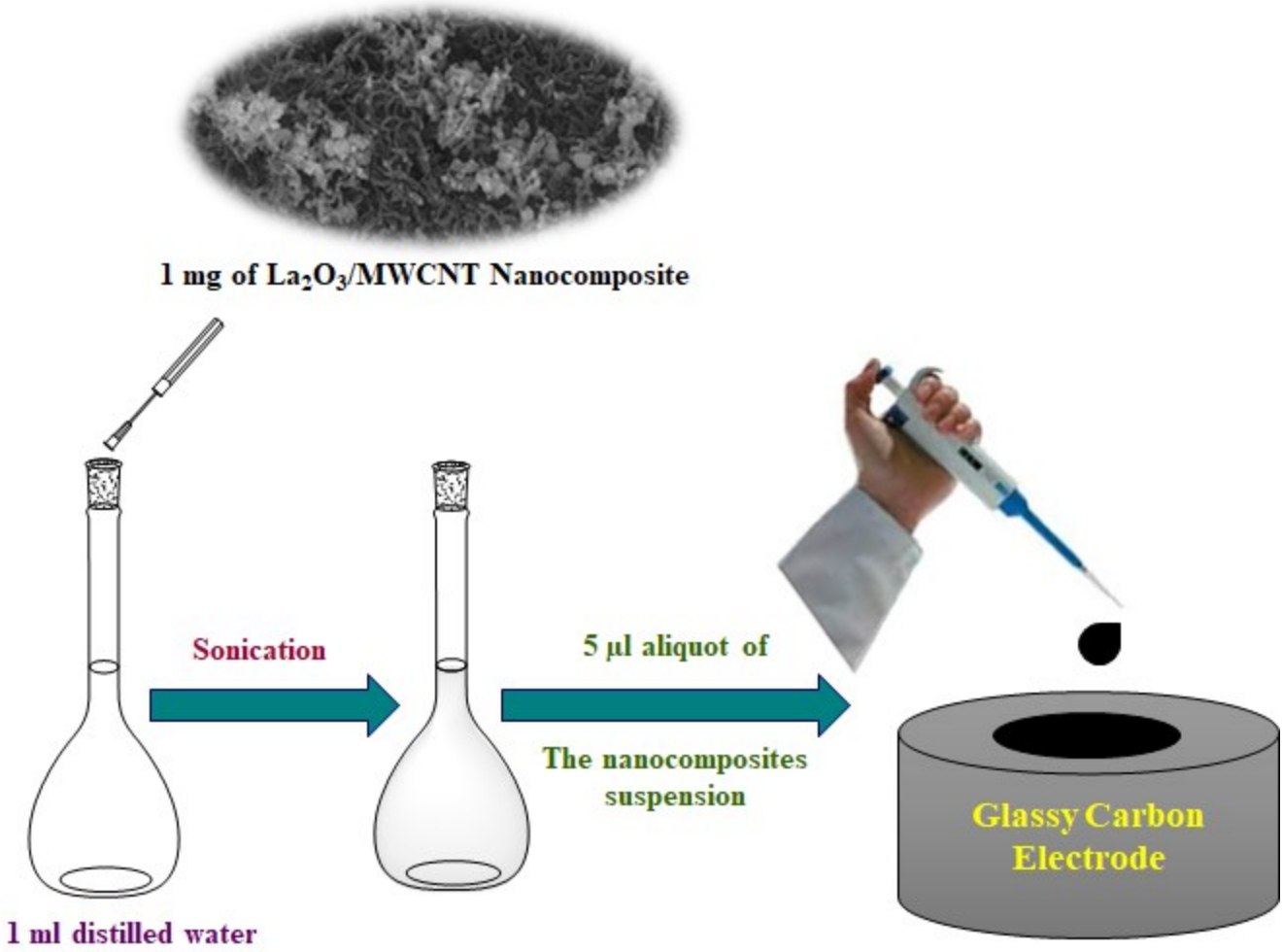


**Fig. S1.** The schematic design of the $La_2O_3$/MWCNT/GCE preparation process.

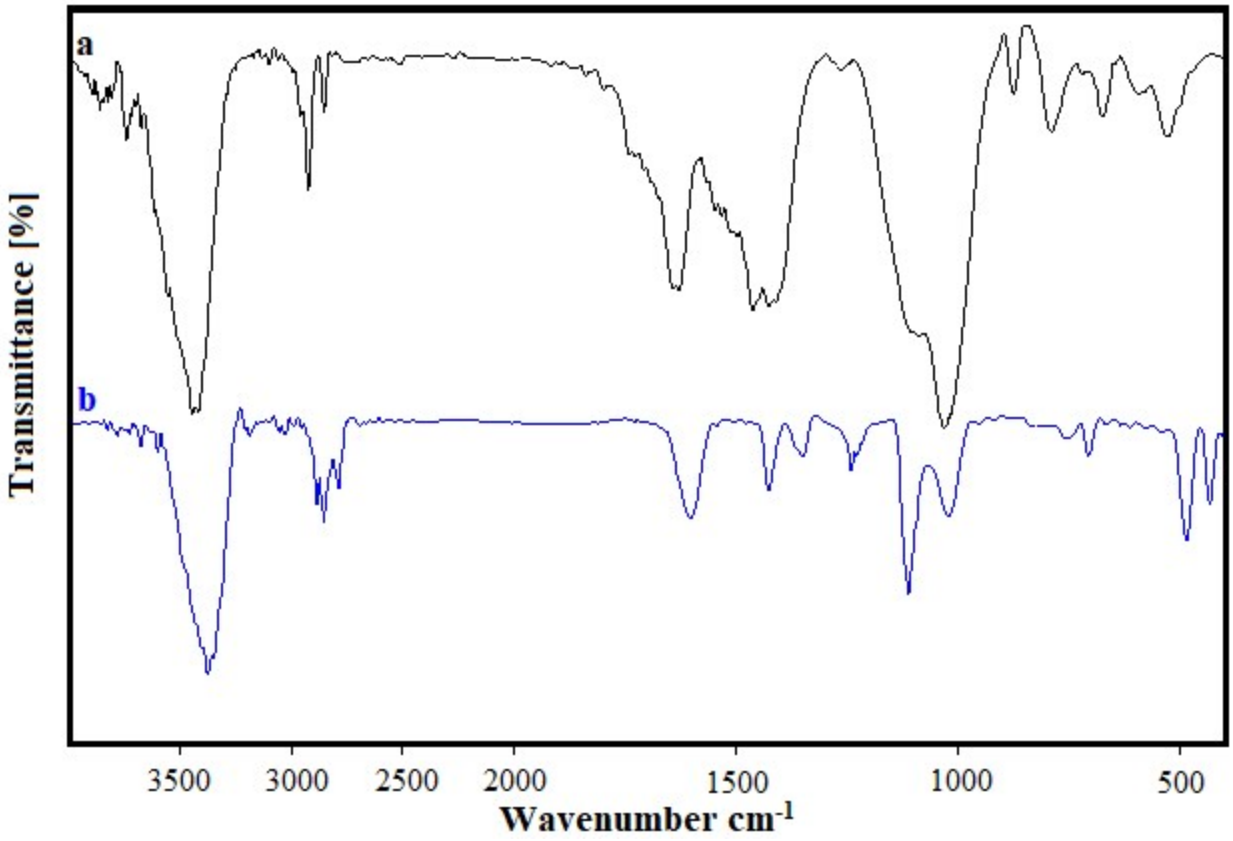


**Fig. S2.** FT-IR spectra of a) pure MWCNTs and b) $La_2O_3$/MWCNT nanocomposite.

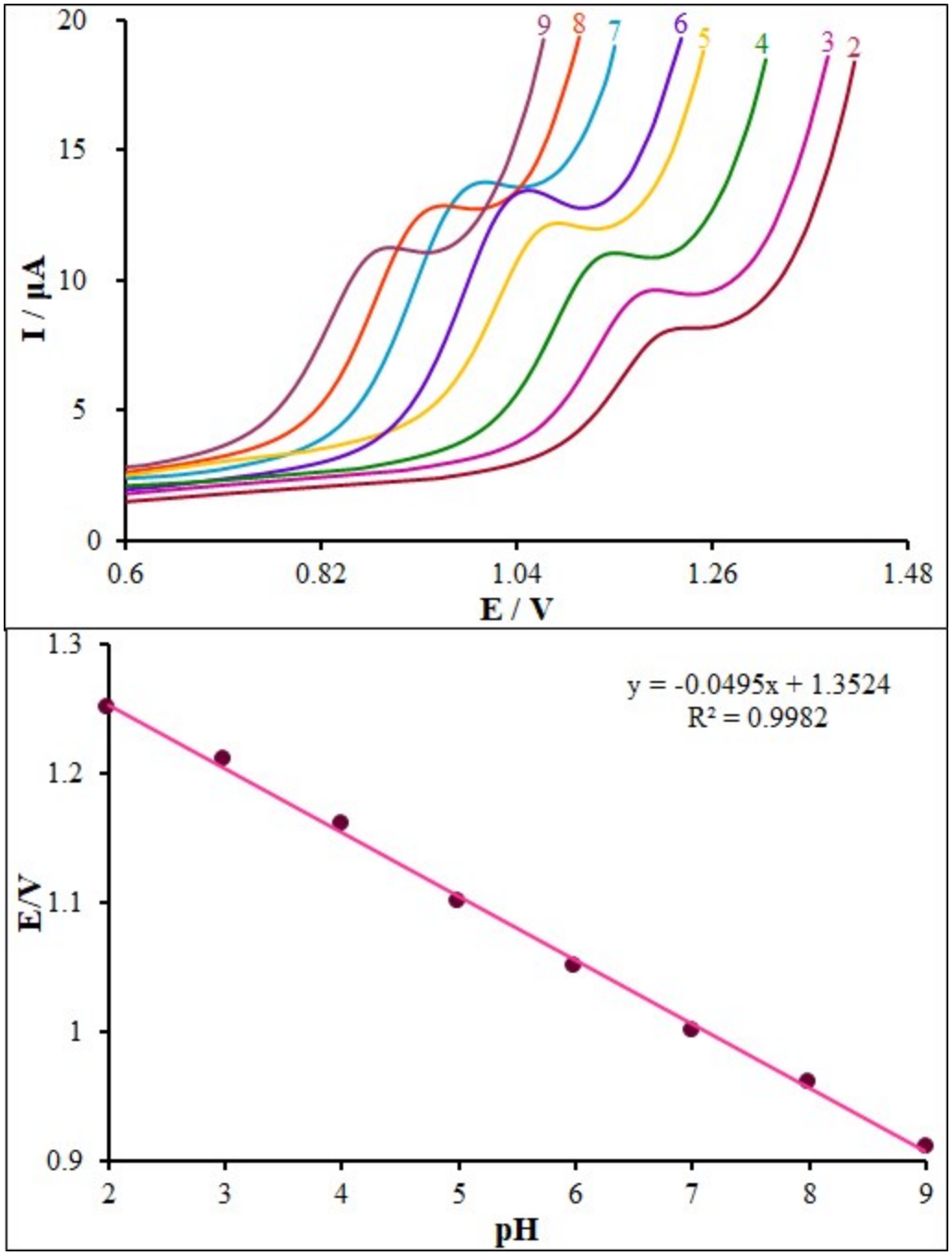


**Fig. S3.** (A) Effect of pH on the peak current for the oxidation of theophylline (125.0 µM); pH= 2-9. Scan rate: 50 mV/s. (B) Plot of peak potential vs. pH.

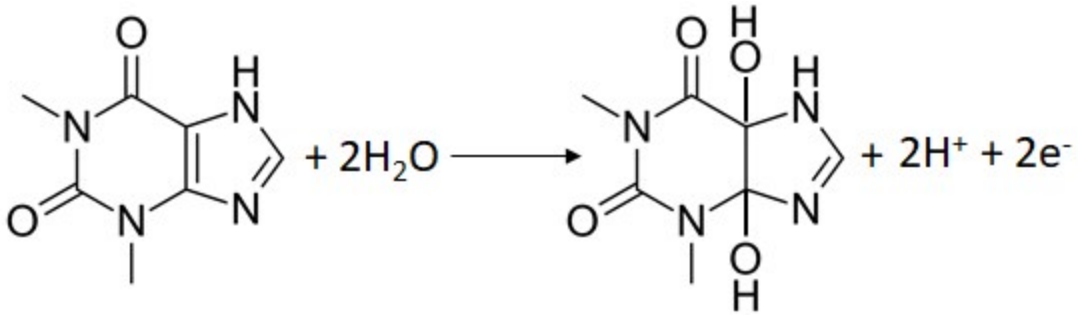


**Fig. S4.** Electro-oxidation mechanism of theophylline at $La_2O_3$/MWCNT/GCE.

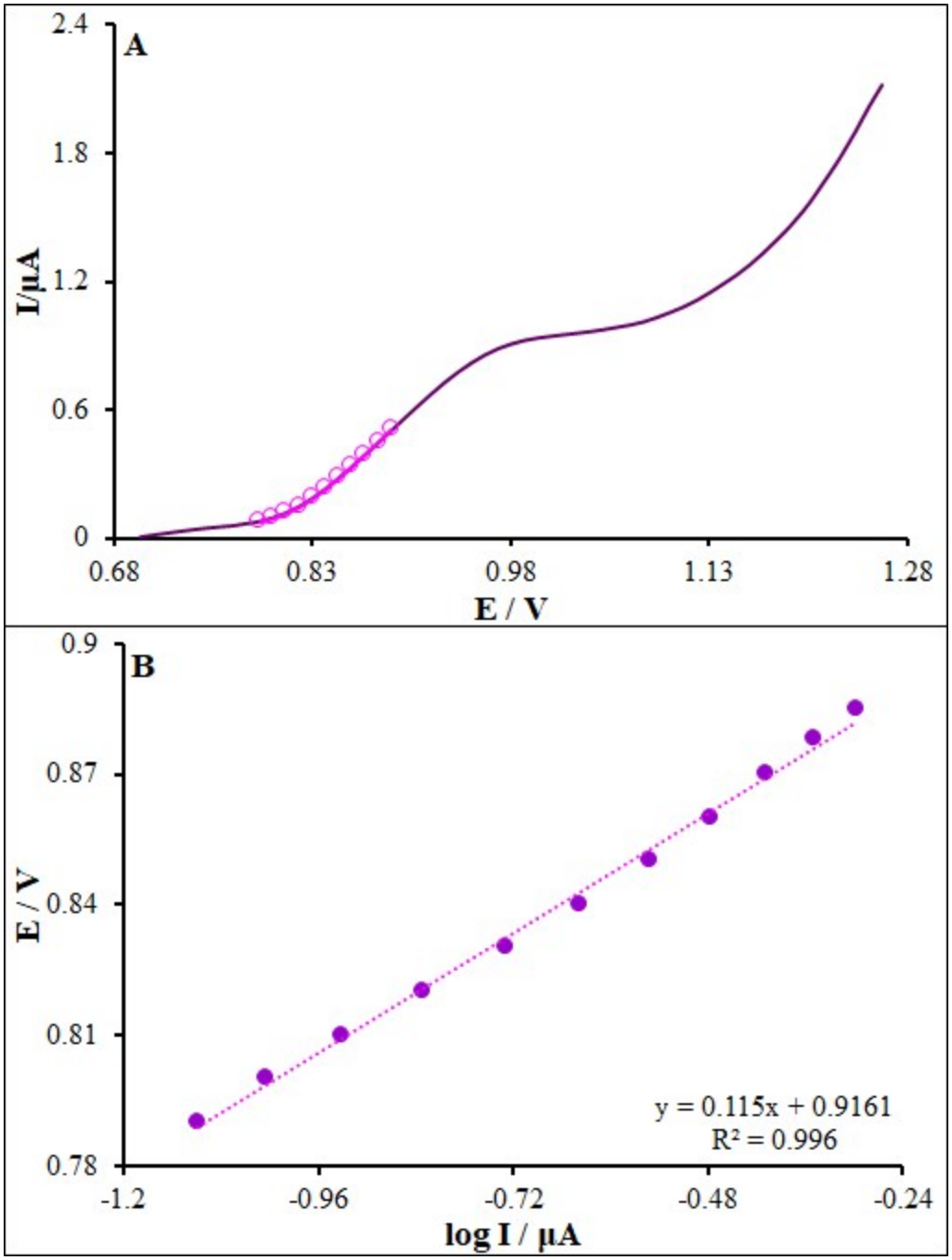


**Fig. S5.** (A) LSV (at 10 mV $s^{-1}$) of $La_2O_3$/MWCNT/GCE in 0.1 M PBS (pH 7.0) containing 100.0 μM theophylline. The points are the data used in the Tafel plot. (B) The Tafel plot derived from the LSV.

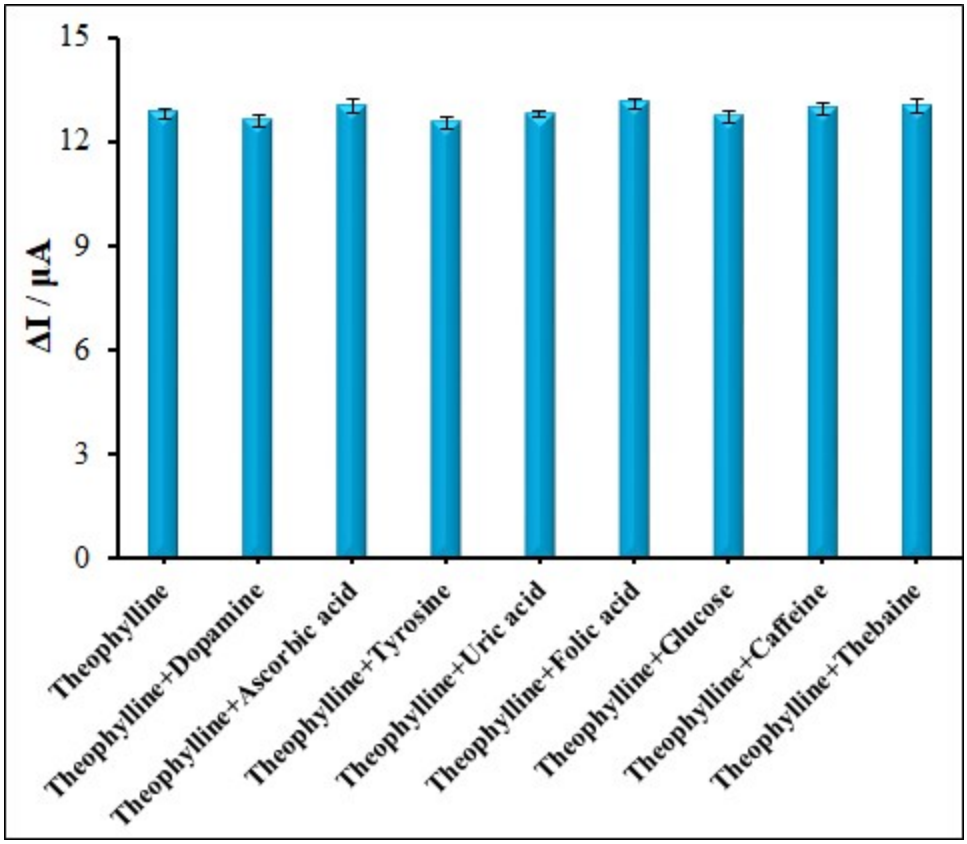


**Fig. S6.** The columns are the current change of $La_2O_3$/MWCNT/GCE in 0.1 M PBS (pH=7.0) solution containing (a) 100.0 μM theophylline, (b) a + 1.0 mM ascorbic acid, (c) a + 1.0 mM uric acid, (d) a + 1.0 mM tyrosine, (e) a + 1.0 mM naltrexone, (f) a + 1.0 mM Heroine, (g) a + 1.0 mM papaverine, (h) a + 1.0 mM caffeine and (i) a + 1.0 mM thebaine.

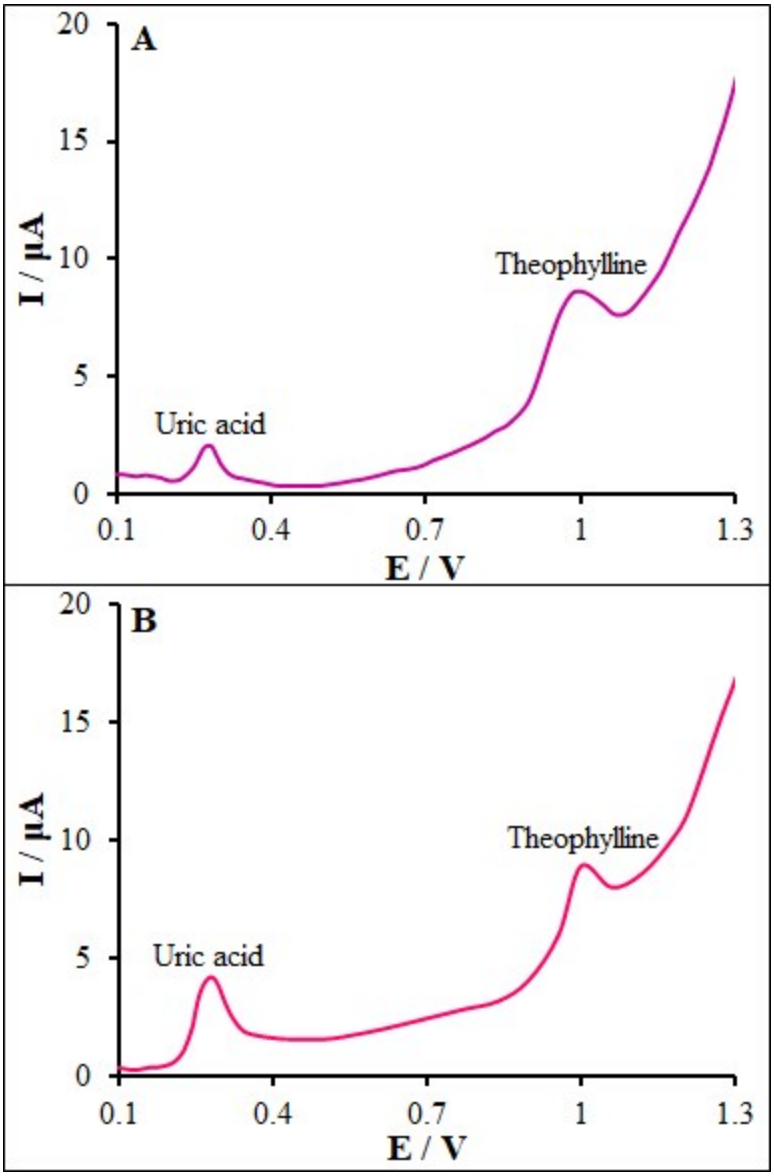


**Fig. S7.** DPV results obtained for (a) human blood serum and (b) human urine at the electrode modified in 0.1 M PBS (pH 7.0) containing 20.0 µM theophylline.