SUPPORTING INFORMATION

PEDOT Nanotubes Electrochemically Synthesized on Flexible Substrates: Enhancement of Supercapacitive and Electrocatalytic Properties

*Bruna M. Hryniewicz and Marcio Vidotti**

Grupo de Pesquisa em Macromoléculas e Interfaces, Departamento de Química,

Universidade Federal do Paraná, CP 19032, 81531-980, Curitiba, PR, Brazil.

*mvidotti@ufpr.br

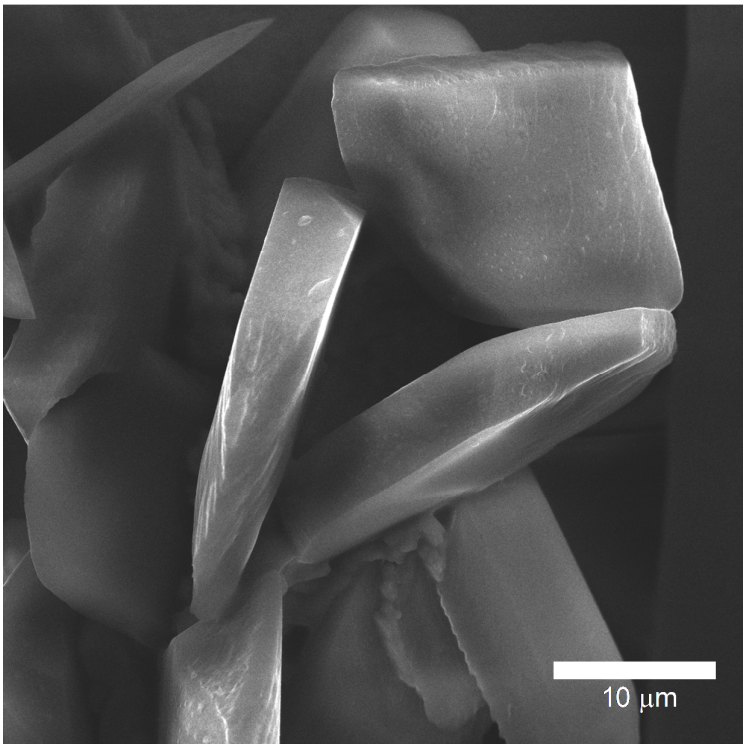

Figure S1. TEM images of MO aggregates formed in pH 4 aqueous solution.

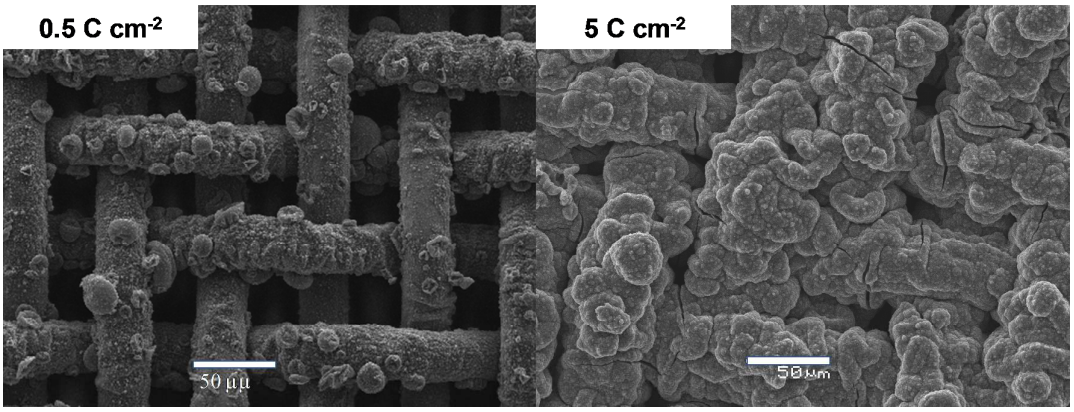

Figure S2. SEM images of pristine PEDOT synthesized with charge control of 0.5 C cm^{-2} and 5 C cm^{-2}.

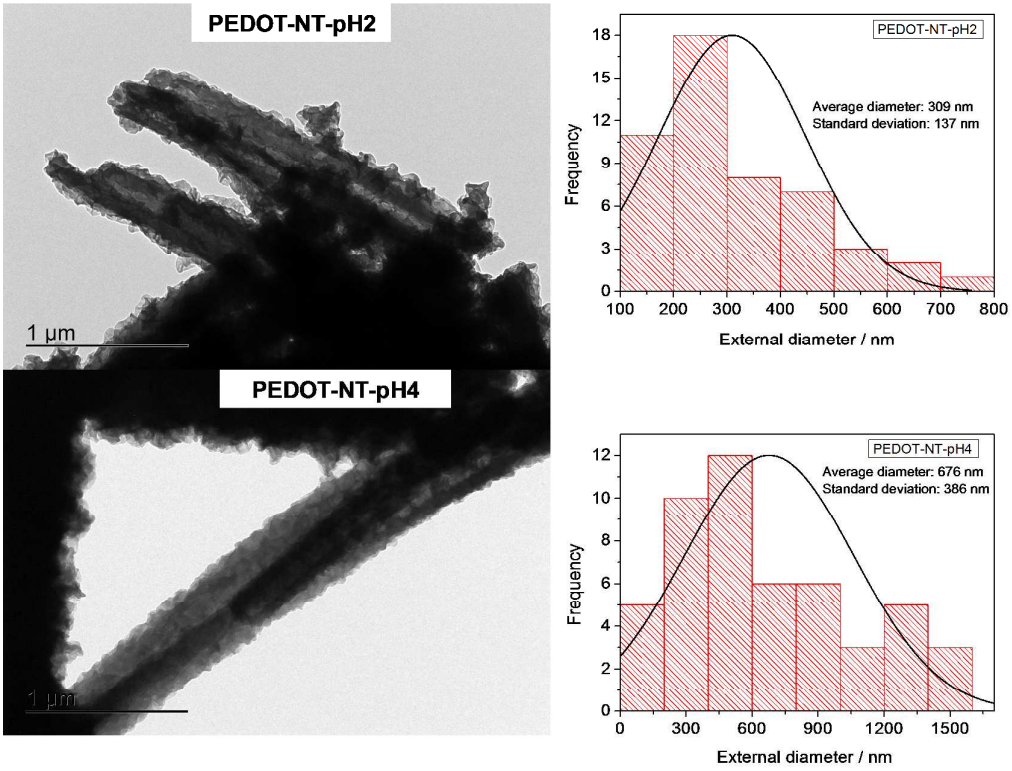

Figure S3. TEM images and diameter distribution of PEDOT-NT-pH2 and PEDOT-NT-pH4 modified electrode with charge control of 0.5 C cm^{-2}.

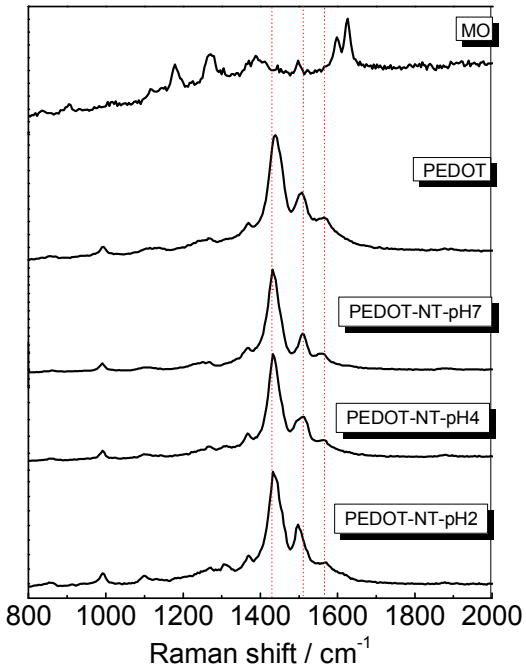

Figure S4. Raman spectra of modified electrodes with charge control of 0.5 C cm^{-2} along with the spectrum of MO aggregates.

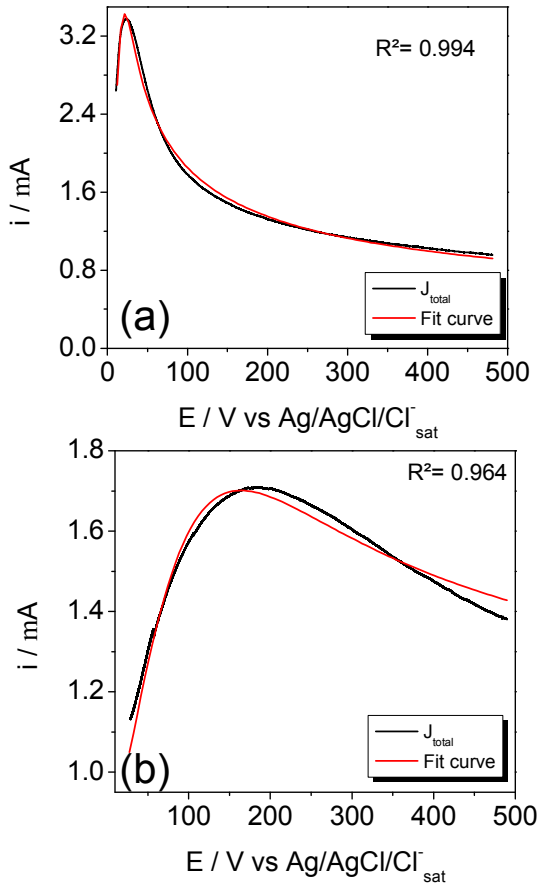

Figure S5. Current-time transients of (a) PEDOT-NT-pH and (b) PEDOT-NT-pH4 modified electrodes with charge control of 0.5 C cm^{-2}, along with fitted curve and the obtained R^2.

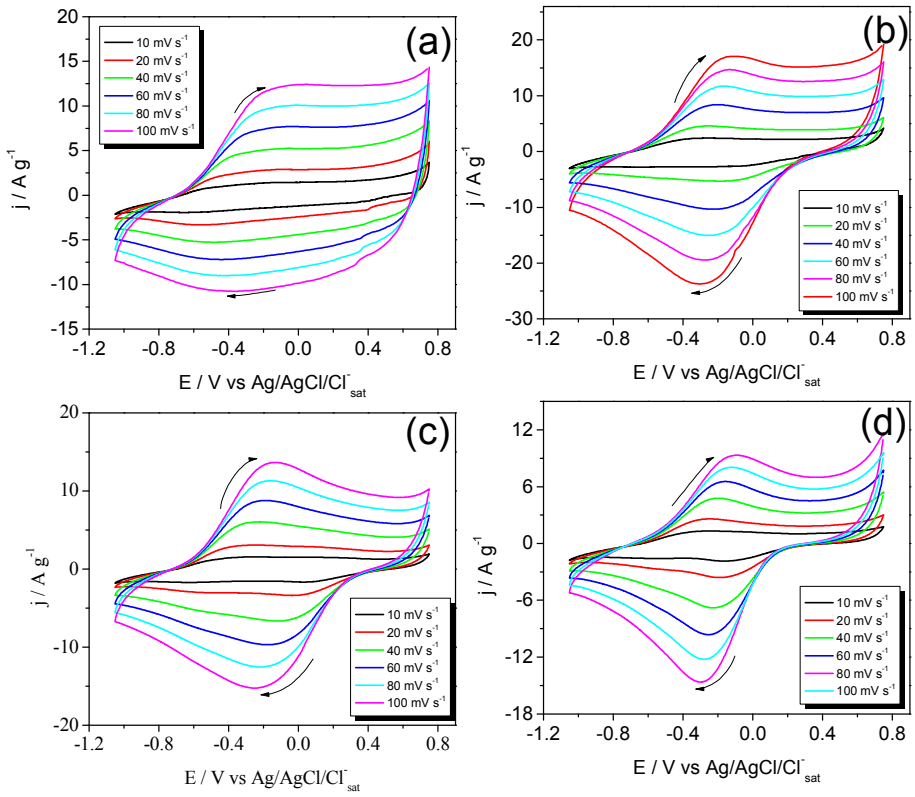

Figure S6. CV at different scan rates of (a) PEDOT, (b) PEDOT-NT-pH2, (c) PEDOT-NT-pH4, (d) PEDOT-NT-pH7 modified electrodes.

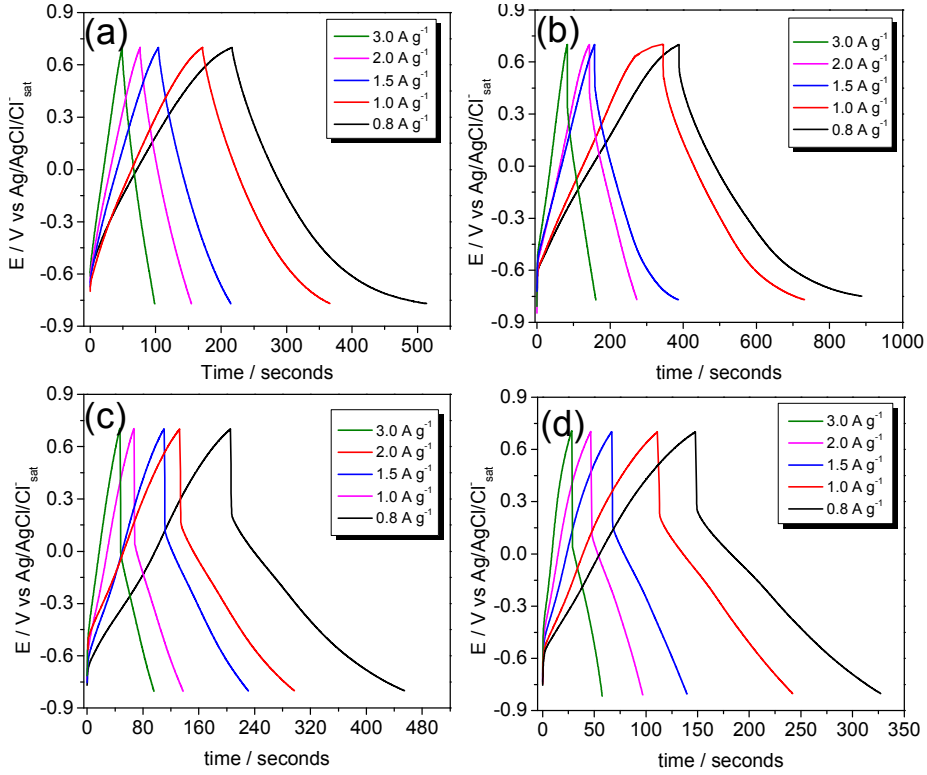

Figure S7. GCD curves at different current densities of (a) PEDOT, (b) PEDOT-NT-pH2, (c) PEDOT-NT-pH4, (d) PEDOT-NT-pH7 modified electrodes.

Table S1. Parameters obtained from fitting current-time transients (Figure 6) using equation 7.

Modified electrode	P1 / mA cm^{-2}	P2 / s^{-1}	P3 / s^{-1}	P4 / A cm^{-2} $s^{1/2}$
PEDOT-NT-pH2	13.97	0.537	0.020	0.017
PEDOT-NT-pH4	83.35	0.018	0.014	0.013

Table S2. Specific capacitances calculated from GCD curves in 1 mmol L^{-1} NaCl.

Specific capacitances / F g^{-1}					
Current Density / A g^{-1}	0.8	1.0	1.5	2	3
PEDOT	161.5	131.9	112.7	106.6	100.8
PEDOT-NT-pH2	307.3	203.7	211.6	259.7	294.3
PEDOT-NT-pH4	164.2	162.5	158.0	152.3	149.7
PEDOT-NT-pH7	139.0	127.1	113.0	110.7	99.7

Table S3. Pseudo-first order rate constants obtained in the kinetic analysis of 2-nitrophenol electrocatalytic reduction.

Modified electrode	Average k_{app} / s^{-1}	Standard deviation
PEDOT	4.22 x 10-4	2.20×10^{-4}
PEDOT-NT-pH2	1.07×10^{-3}	4.87×10^{-5}
PEDOT-NT-pH4	4.88×10^{-4}	4.78×10^{-5}
PEDOT-NT-pH7	5.14×10^{-4}	8.56×10^{-5}