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Electropolymerized Polyaniline/Manganese Iron Oxide Hybrids with Enhanced Color Switching Response and Electrochemical Energy Storage

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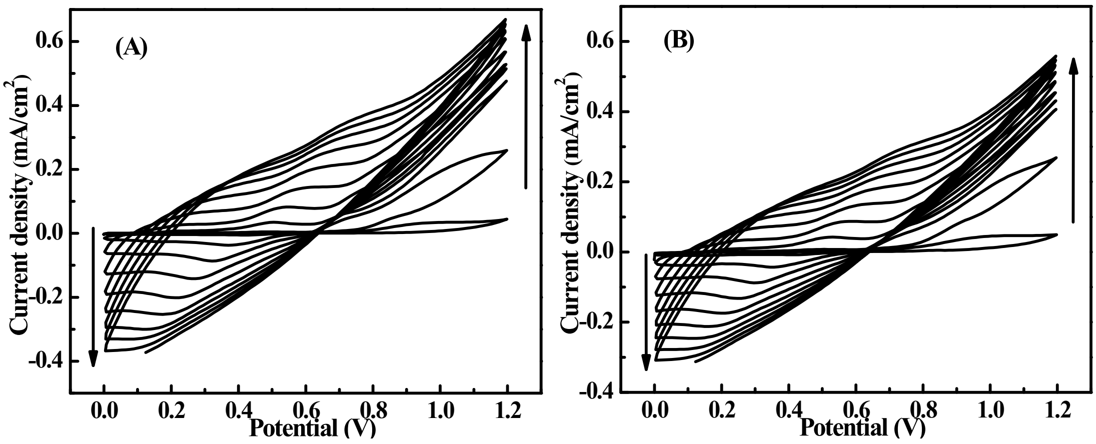

Fig. S1 Electropolymerization synthesis of PANI onto **(A)** bare and **(B)** $MnFe_2O_4$ coated ITO glasses at a scan rate of 50 mV/s in 0.5 M H_2SO_4 aqueous solution containing 0.1 M aniline.

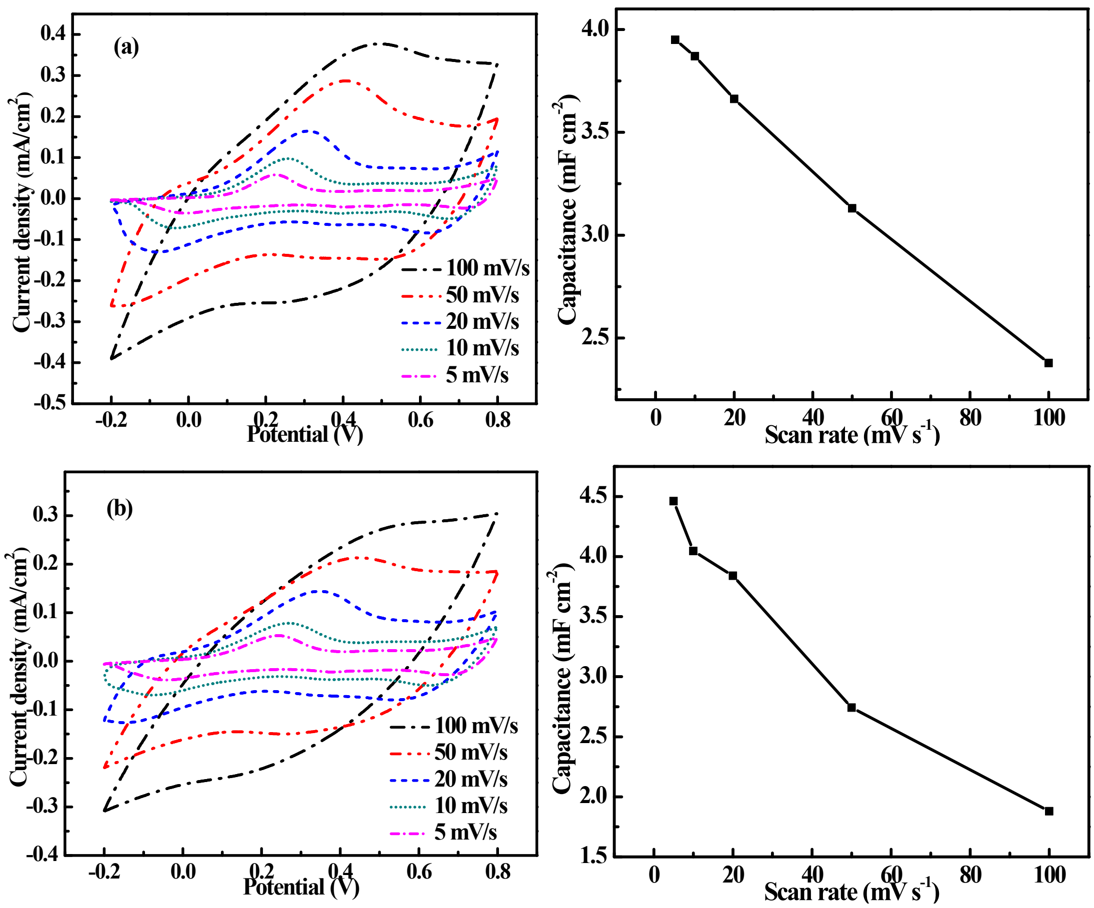

Fig. S2 CV curves (left) and corresponding scan rate dependent areal capacitance (right) of (a) pristine PANI film and (b) PANI/$MnFe_2O_4$ nanocomposites film at different scan rates under a potential range from -0.2 to 0.8 V in 1.0 M H_2SO_4 aqueous solution.

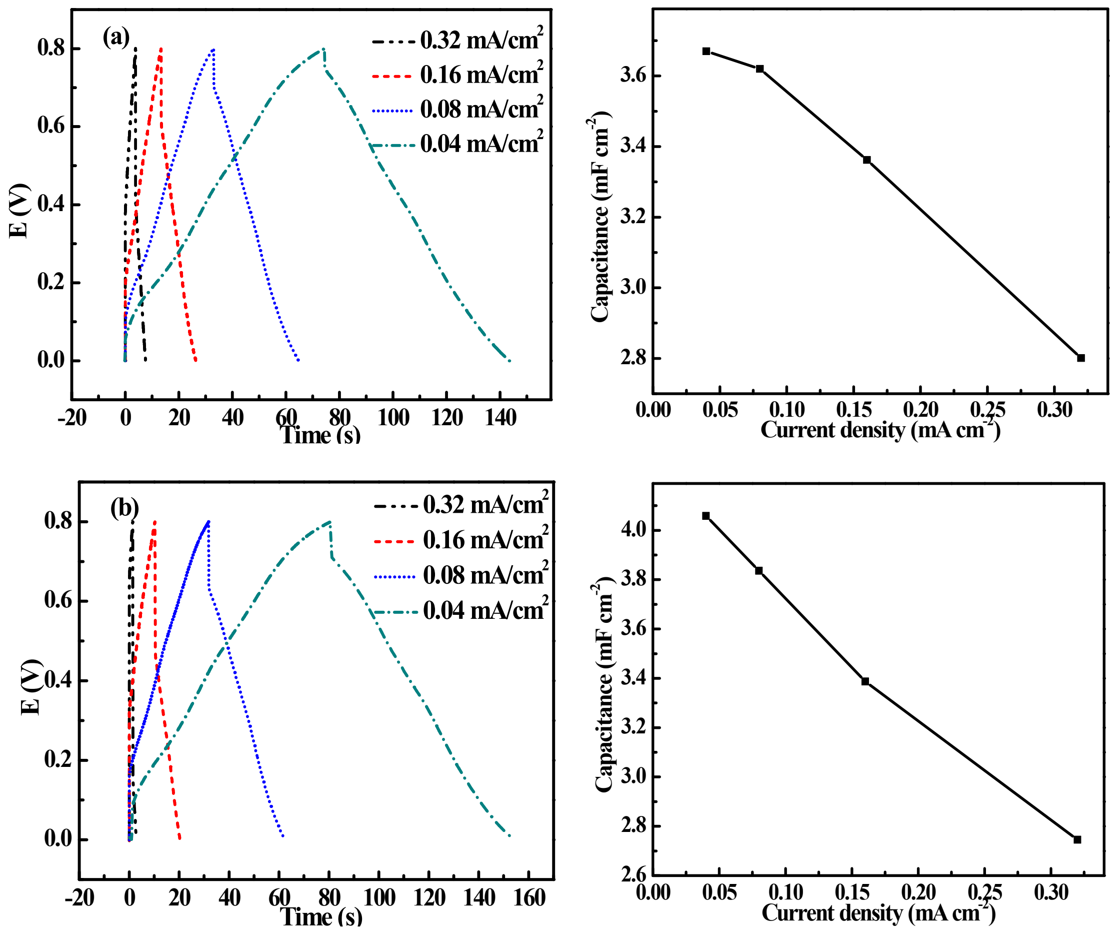

Fig. S3 Galvanostatic charge-discharge curves (on the left) and corresponding current density dependent areal capacitance (on the right) of **(a)** pristine PANI film and **(b)** PANI/$MnFe_2O_4$ nanocomposites film in 1.0 M H_2SO_4 aqueous solution.

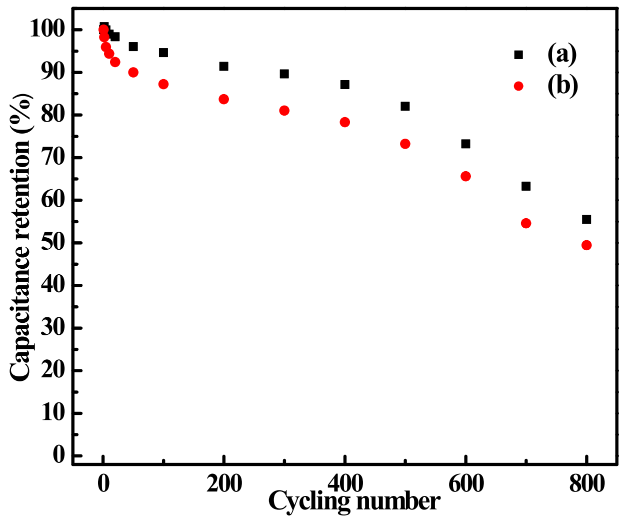

Fig. S4 Cycling stability of (a) pristine PANI and (b) PANI/$MnFe_2O_4$ nanocomposites electrodes at 0.08 mA/cm^2 for 800 cycles.

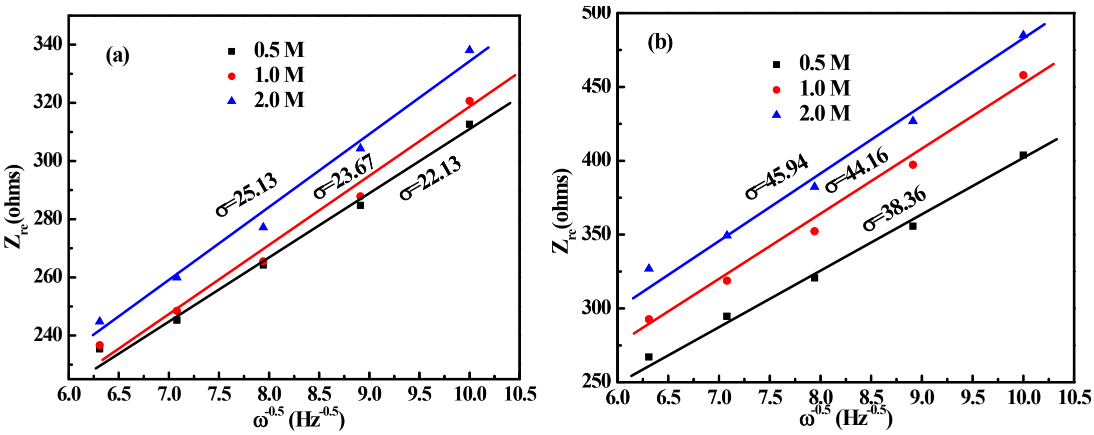

Fig. S5 The Warburg factor σ of (a) pristine PANI and (b) PANI/Mn_2FeO_4 nanocomposites films conducted in 0.5, 1.0 and 2.0 M H_2SO_4 aqueous solution.

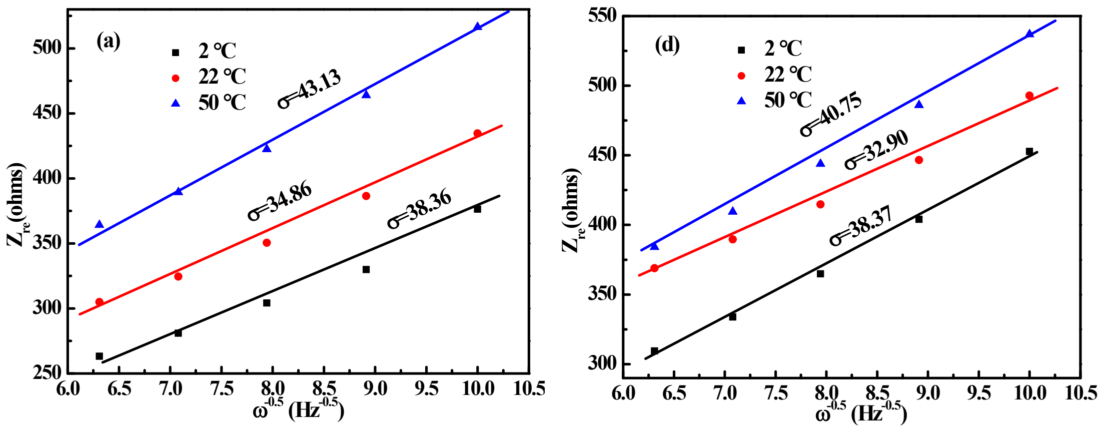

Fig. S6 The Warburg factor σ of (a) pristine PANI and (b) PANI/Mn_2FeO_4 nanocomposites films conducted in 2, 22 and 50 ºC H_2SO_4 aqueous solution.

The anion diffusion coefficient can be calculated from Equation S(1):

$$D = R^2T^2/(2A^2n^4F^4C^2\sigma^2) \qquad \text{S(1)}$$

where D is the diffusion coefficient of the HSO_4^- anions, R is the gas constant (8.314), T is the absolute temperature, A is the surface area of the electrode (4 cm^2), n is the number of electrons per molecule during the oxidization (n is 2), F is the Faraday constant (96485 sA/mol), C is the concentration of ions (mol/cm^3), σ is the Warburg factor which can be obtained from the slopes in the low frequency region (<1 Hz) of EIS (Figure S5&6).

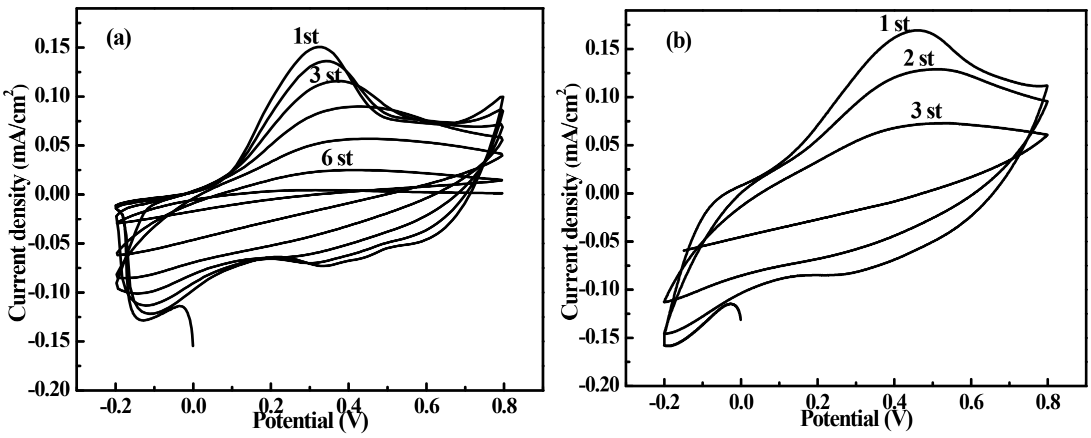

Fig. S7 The first 6 and 3 CVs of the pristine PANI and PANI/$MnFe_2O_4$ nanocomposites films at 50 ºC.