

## **Electronic Supplementary Information (ESI)**

# **Influences of Solvents and Monomer Concentrations on the Electrochemical Performance and Structural Properties of Electrodeposited PEDOT Films: A Comparative Study in Water and Acetonitrile**

Yang Zhang,<sup>a</sup> Linze Li<sup>\*a</sup> and Bingwei He<sup>\*a</sup>

<sup>a</sup> School of Mechanical Engineering and Automation, Fuzhou University, Fuzhou 350108, China.

\*Corresponding authors: E-mail: lzli@fzu.edu.cn; mebwhe@fzu.edu.cn

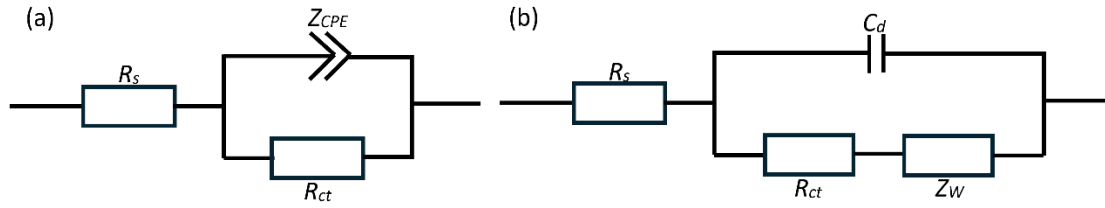


Fig. S-1 Equivalent circuits. (a) Model A using for the PEDOT electrodes deposited at 1 mM concentration; (b) Model B using for PEDOT electrodes deposited at other concentrations. Therein,  $R_s$  represented the solution resistance,  $R_{ct}$  signified the charge transfer resistance,  $Z_{CPE}$  stood for the constant phase element,  $Z_w$  indicated the Warburg impedance,  $C_d$  symbolized the capacitance. And the impedance of the CPE is sufficiently described as  $Z_{CPE}=1/(Y_0(j\omega)^n)$ , where  $Y_0$  is the parameter containing the capacitance information,  $\omega$  is angular frequency and  $n$  is a constant ranging from 0 to 1.

Table S-1 Nyquist curve fitting results

Solvent	EDOT Concentration (mM)	Circuit Model	$R_s$ ( $\Omega$ )	$R_{ct}$ ( $\Omega$ )	$Y_0$ ( $Fs^{n-1}$ )	$n(0 < n < 1)$
Water	1	Model A	77.9	$4.44 \times 10^4$	$1.56 \times 10^{-5}$	0.809
Acetonitrile	1		81.8	$2.16 \times 10^5$	$3.13 \times 10^{-5}$	0.919
Solvent	EDOT Concentration (mM)	Circuit Model	$R_s$ ( $\Omega$ )	$R_{ct}$ ( $\Omega$ )	$Z_w$ ( $\Omega$ )	$C_d$ (F)
Water	5	Model B	109.4	717.4	1450.0	$3.22 \times 10^{-5}$
	10		101.2	238.3	589.8	$9.34 \times 10^{-5}$
	15		100.2	204.5	326.5	$1.16 \times 10^{-4}$
	20		90.5	202.8	308.9	$1.76 \times 10^{-4}$
Acetonitrile	10		75.7	97.6	136.0	$3.66 \times 10^{-4}$
	20		77.6	93.6	120.0	$7.52 \times 10^{-4}$
	50		64.9	78.7	98.7	$1.71 \times 10^{-3}$
	100		60.7	72.4	96.9	$2.17 \times 10^{-3}$

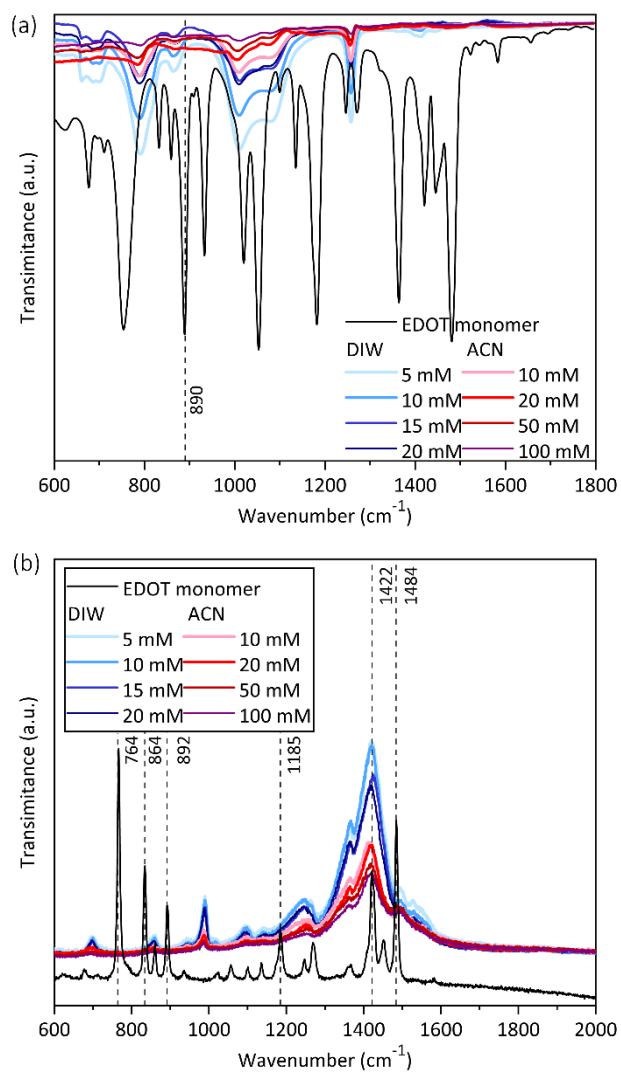


Fig. S-2 Comparison of (a) infrared and (b) Raman spectra before and after EDOT polymerization

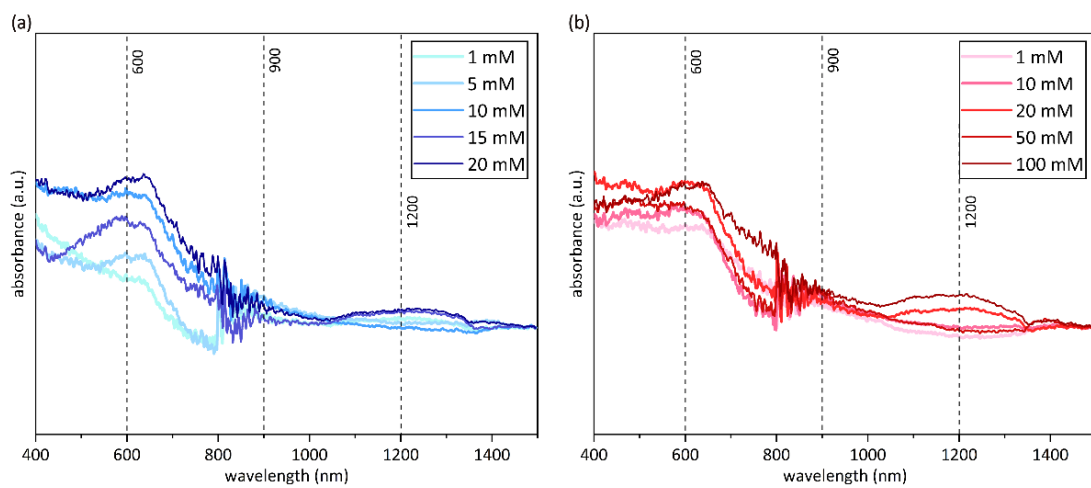


Fig. S-3 UV-visible absorption spectroscopy after PEDOT electrodeposition in (a) water and (b) acetonitrile at different monomer concentrations.

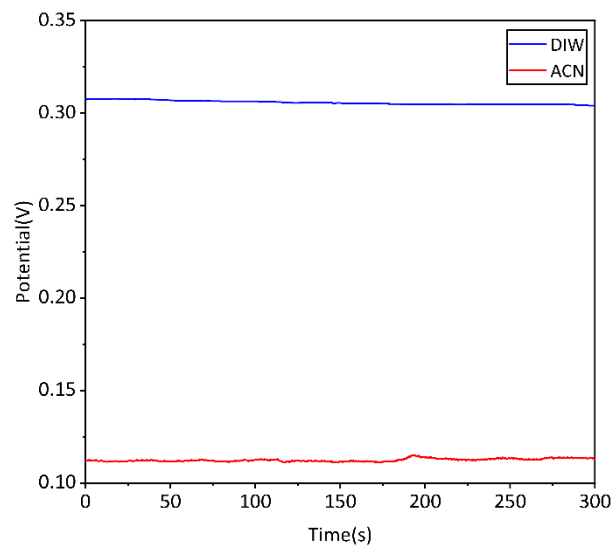


Fig. S-4 The open circuit potential detected in water and acetonitrile