

Supporting Information

for

**PEDOT:PSS versus Polyaniline: A Comparative Study of Conducting  
Polymers for Organic Electrochemical Transistors**

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## **General Measurements**

A patterned electrode (BAS 0011598) was used as the substrate electrode of OECTs. A ultraviolet ozone cleaner (TECHNOVISION, INC. UV-208) was used to clean the substrate of OECTs. A spin coater used was MIKASA MS-B100. For thermal annealing, a digital hotplate of CORNING PC-400D was used. Output and transfer characteristics were measured using a parameter analyzer, KEITHLEY 4200A-SCS. Film thickness measurements were done with a surface profilometer, KLA-Tencor D-100. Atomic force microscopy (AFM) was measured by using an SPI3800N and SPA300 with a stiff cantilever DF-20.

## Supporting Tables

**Table S1** Characteristics of OECTs based on PEDOT:PSS

Sample	P1000- 5s	P1500- 5s	P2000- 5s	P2500- 5s	P3000- 5s	P2000- 0s	P2000- 5min	P2000- 15min	P2000- 1h	P2000- 18h
<b>ON Resistance</b> [ $\Omega$ ]	1400	1200	1160	1300	1470	940	1310	1350	1310	1080
<b>Resistivity</b> [ $\Omega \cdot \text{m}$ ]	0.12	0.090	0.067	0.065	0.055	0.052	0.075	0.078	0.075	0.062
<b>Conductivity</b> [S/m]	8.16	11.1	15.0	15.4	18.1	19.3	13.3	12.9	13.3	16.1
<b>Thickness</b> [nm]	$\pm 0.23$	$\pm 0.4$	$\pm 1.6$	$\pm 1.4$	$\pm 1.7$	$\pm 1.7$	$\pm 1.4$	$\pm 1.4$	$\pm 1.4$	$\pm 1.8$
	350	300	230	200	150	220	230	230	230	230
	$\pm 10$	$\pm 11$	$\pm 25$	$\pm 18$	$\pm 14$	$\pm 19$	$\pm 25$	$\pm 25$	$\pm 25$	$\pm 25$

**Table S2** Characteristics of OECTs based on PANI

Sample	PA1000- 5s	PA1500- 5s	PA2000- 5s	PA2500- 5s	PA3000- 5s	PA1500- 0s	PAD1500- 5s	PAD3000- 5s	PAD1500- 0s
<b>ON Resistance</b> [ $\Omega$ ]	2790	3380	3410	3750	3990	2920	3770	4710	4240
<b>Resistivity</b> [ $\Omega \cdot \text{m}$ ]	1.10	1.13	0.96	0.98	0.98	0.83	0.91	0.99	1.29
<b>Conductivity</b> [S/m]	$\pm 0.04$	$\pm 0.03$	$\pm 0.03$	$\pm 0.03$	$\pm 0.03$	$\pm 0.01$	$\pm 0.06$	$\pm 0.02$	$\pm 0.02$
<b>Thickness</b> [ $\mu\text{m}$ ]	0.91	0.88	1.05	1.03	1.02	1.20	1.09	1.01	0.77
	$\pm 0.04$	$\pm 0.03$	$\pm 0.04$	$\pm 0.03$	$\pm 0.03$	$\pm 0.01$	$\pm 0.07$	$\pm 0.02$	$\pm 0.01$
	1.57	1.34	1.12	1.04	0.98	1.14	0.97	0.84	1.22
	$\pm 0.06$	$\pm 0.04$	$\pm 0.04$	$\pm 0.03$	$\pm 0.03$	$\pm 0.01$	$\pm 0.06$	$\pm 0.02$	$\pm 0.02$

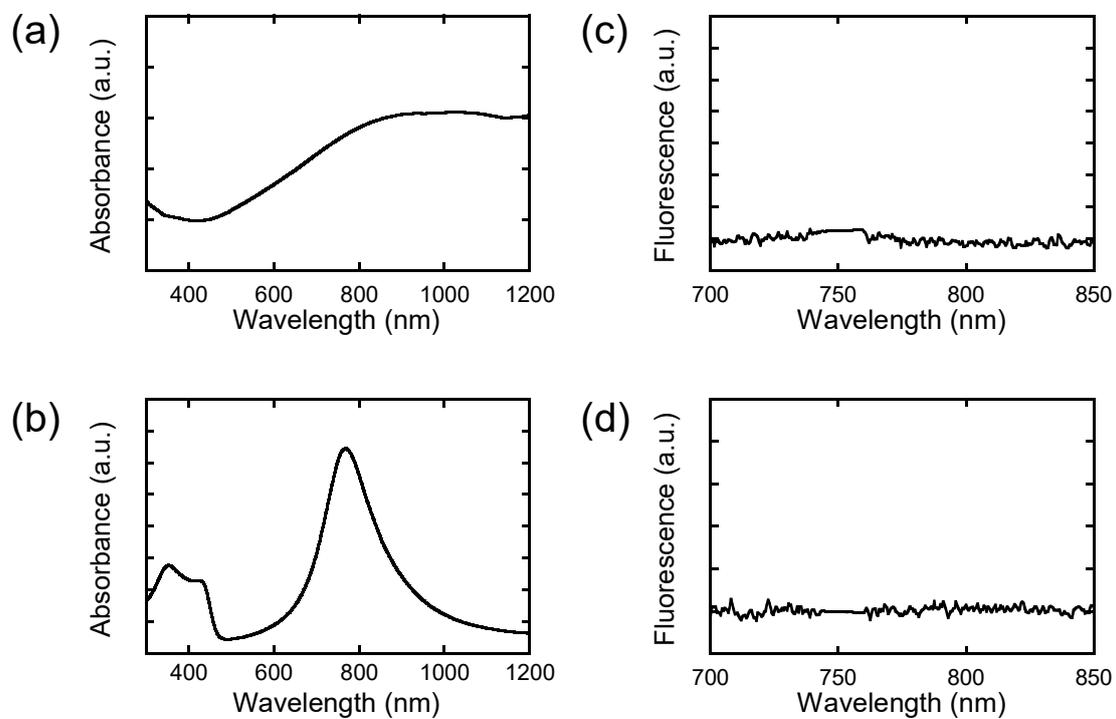
**Table S3** Surface roughness (Ra) of PEDOT:PSS films

Sample	P1000-5s	P2000-5s	P3000-5s	P2000-0s	P2000-5min	P2000-15min	P2000-18h
<b>1<math>\mu\text{m}^2</math>[nm]</b>	2.72 $\pm 0.07$	2.84 $\pm 0.09$	2.47 $\pm 0.14$	2.68 $\pm 0.20$	2.56 $\pm 0.14$	2.43 $\pm 0.12$	1.73 $\pm 0.10$
<b>10<math>\mu\text{m}^2</math>[nm]</b>	4.51 $\pm 0.52$	4.62 $\pm 0.54$	3.44 $\pm 0.34$	3.83 $\pm 0.24$	4.76 $\pm 0.43$	3.05 $\pm 0.39$	2.71 $\pm 0.16$

**Table S4** Surface roughness (Ra) of PANI films

Sample	PA1500-5s	PA3000-5s	PA1500-0s	PAD1500-5s	PAD3000-5s	PAD1500-0s
<b>1<math>\mu\text{m}^2</math>[nm]</b>	0.652 $\pm 0.03$	0.764 $\pm 0.03$	0.841 $\pm 0.05$	0.761 $\pm 0.07$	0.708 $\pm 0.04$	0.784 $\pm 0.06$
<b>10<math>\mu\text{m}^2</math>[nm]</b>	3.78 $\pm 1.49$	3.94 $\pm 1.28$	6.07 $\pm 1.45$	3.17 $\pm 0.52$	5.31 $\pm 1.19$	1.78 $\pm 0.25$

## Supporting Figure



**Figure S1** (a,b) Absorption and (c,d) fluorescence (excited at 750 nm) spectra of the thin films of (a,c) PEDOT:PSS and (b,d) PANI.