

## Supporting Information for

### **Unexpected Fluorescent Emission of Graft Sulfonated-Acetone-Formaldehyde Lignin and Its Application as Dopant of PEDOT for High Performance Photovoltaic and Light-Emitting Devices**

*By Nanlong Hong<sup>1,2</sup>, Jingyang Xiao<sup>3</sup>, Yuda Li<sup>1,2</sup>, Yuan Li<sup>\*1,2</sup>, Ying Wu<sup>1,2</sup>, Wei Yu<sup>1,2</sup>, Xueqing Qiu<sup>\*1,2</sup>,  
Runfeng Chen<sup>\*4</sup>, Hin-Lap Yip<sup>\*3</sup>, Wei Huang<sup>4</sup>, Yong Cao<sup>3</sup>*

<sup>1</sup>School of Chemistry and Chemical Engineering, South China University of Technology, Guangzhou, 510640, China.

<sup>2</sup>State Key Laboratory of Pulp and Paper Engineering, South China University of Technology, Guangzhou, China

<sup>3</sup>Institute of Polymer Optoelectronic Materials and Devices, State Key Laboratory of Luminescent Materials and Devices, South China University of Technology, Guangzhou, 510640, China.

<sup>4</sup>Key Laboratory for Organic Electronics and Information Displays & Institute of Advanced Materials, Jiangsu National Synergistic Innovation Center for Advanced Materials, Nanjing University of Posts & Telecommunications, 9 Wenyuan Road, Nanjing, 210023, China.

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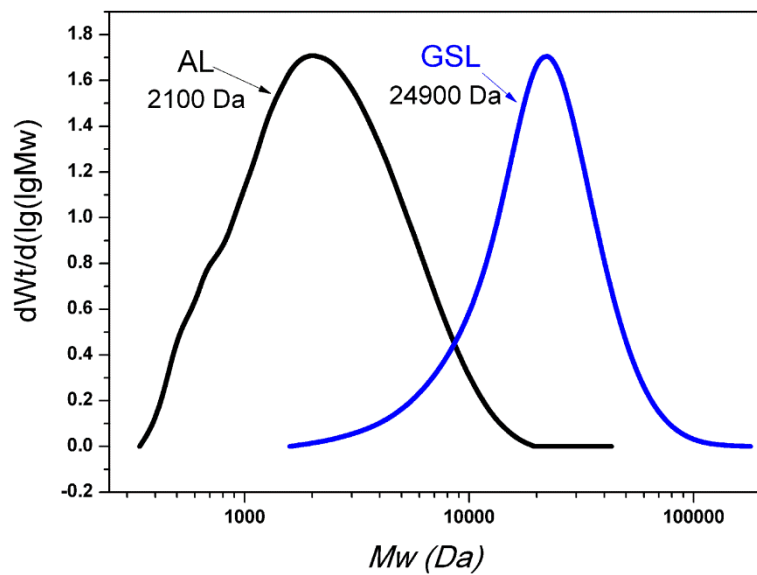
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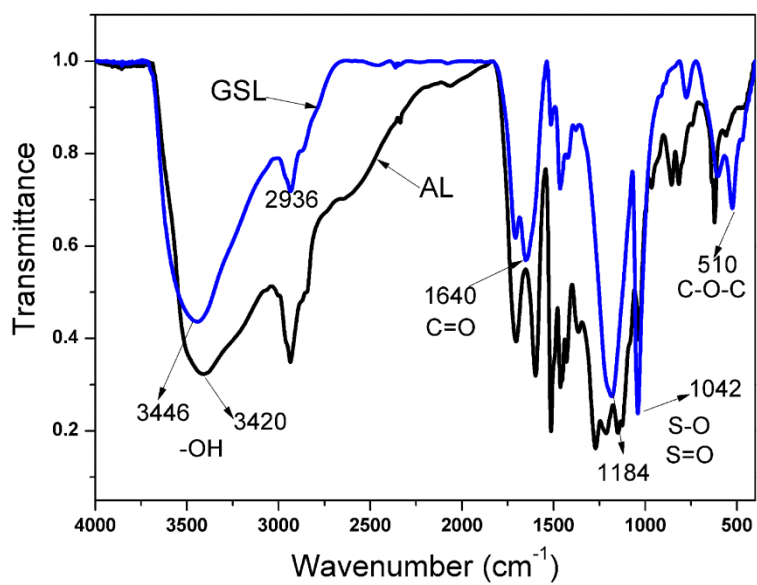
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## Supplemental Figures

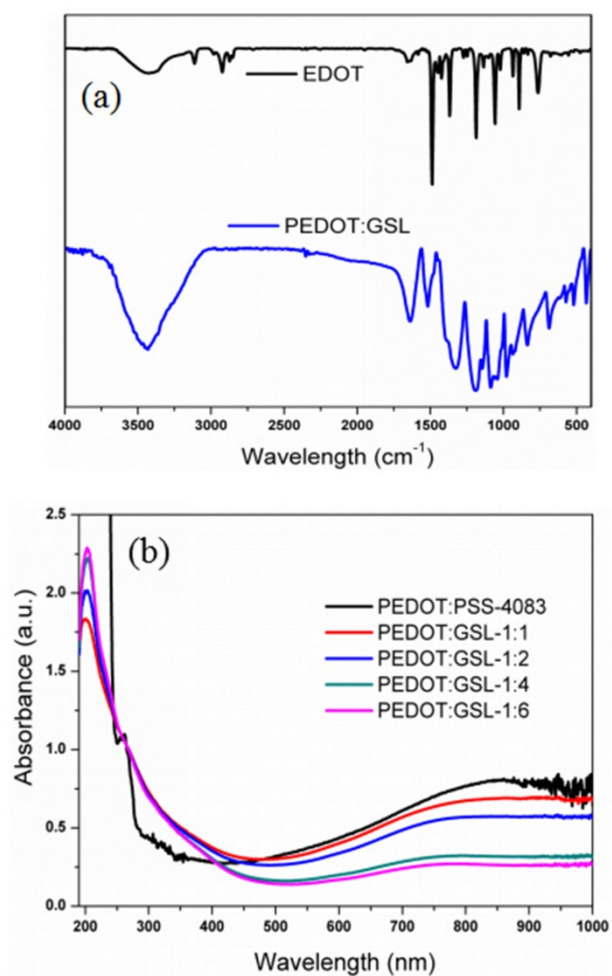
**Figure S1.** Molecular weight distribution of raw material alkali lignin (AL) by organic phase GPC method and grafted sulfonated-acetone-formaldehyde lignin (GSL) by aqueous GPC method.



**Figure S2.** The chemical structure of raw material GSL detected by FT-IR measurement.



**Figure S3.** (a) FT-IR spectra of EDOT monomer and PEDOT:GSL. (b) UV-vis absorption spectra of PEDOT:PSS-4083 and PEDOT:GSL with different mass ratios.



**Table S1.** Molecular weight distribution and functional group contents of raw material alkali lignin (AL) and grafted sulfonated-acetone-formaldehyde lignin (GSL).

Samples	Mw (Da)	Mn (Da)	PDI	Functional group contents	
				-OH (mmol/g)	-SO <sub>3</sub> H (mmol/g)
AL	2100	1100	1.91	2.11	0
GSL	24900	9100	2.74	1.63	2.54

**Table S2.** The conductivities of PEDOT:PSS-4083 film, PEDOT:GSL films with different mass ratios of dopant.

Samples	Sheet resistance ( $\Omega/\square$ )	Film thickness (nm)	Conductivity (S/cm)
PEDOT:PSS-4083	134742	6083	$1.22 \times 10^{-2}$
PEDOT:GSL-1:1	129065	473	$1.64 \times 10^{-1}$
PEDOT:GSL-1:2	103115	1058	$9.17 \times 10^{-2}$
PEDOT:GSL-1:4	181230	1537	$3.59 \times 10^{-2}$
PEDOT:GSL-1:6	431667	1188	$1.95 \times 10^{-2}$