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Supporting Information for:

Enhanced Adsorption and Degradation of Phenolic Pollutants in Water by Carbon Nanotubes Modified Laccase-carrying Electrospun Fibrous Membranes

Yunrong Dai [a,b], *Jun Yao* [a,*], *Yonghui Song* [b], *Siyu Wang* [b], *Yu Yuan* [b]

[a] *School of Water Resources and Environment, School of Scientific Research, China University of Geosciences (Beijing), 100083, Beijing, P. R. China*

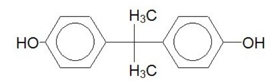
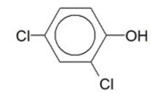
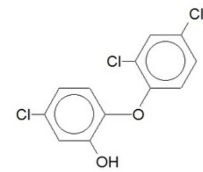
[b] *Department of Urban Water Environmental Research, Chinese Research Academy of Environmental Sciences, 100012, Beijing, P. R. China*

This Supporting Information contains the detailed information on "**Selected physicochemical properties of three phenolic organics**", "**SEM images of LCEFMs**", "**The digital photos of PDLLA LCEFMs and MWCNTs-LCEFMs"**, "Electrochemical experiments" and "Nyquist diagrams of the LCEFMs and MWCNTs- LCEFMs".

In total, there are one table and three figures, and the document length is three pages.

[a] School of Water Resources and Environment, School of Scientific Research, China University of Geosciences (Beijing), 100083, Beijing, P. R. China
[b] Department of Urban Water Environmental Research, Chinese Research Academy of Environmental Sciences, 100012, Beijing, P. R. China
[*] Corresponding author. Tel. and fax: +86-10-82321958.
E-mail: yaoj@cugb.edu.cn (J. Yao).

Table S1 Selected physicochemical properties of three phenolic organics

Phenolic organics	Abbr.	Mol. Formula[a]	M_W[b] ($g \cdot mol^{-1}$)	LogK_{ow}[c]	S_w[d] ($mg \cdot L^{-1}$)	Mol. Structure[e]
Bisphenol A	BPA	$C_{15}H_{16}O_2$	228	3.32	300	
2,4-Dichlorophenol	2,4-DCP	$C_6H_4Cl_2O$	163	3.06	4500	
Triclosan	TCS	$C_{12}H_7Cl_3O_2$	289	4.76	10	

a Molecular formula.
b Molecular weight.
c Octanol-water partition coefficient.
d Water solubility at 20 °C.
e Molecular structure.
All of data were from SRC PhysProp Database.

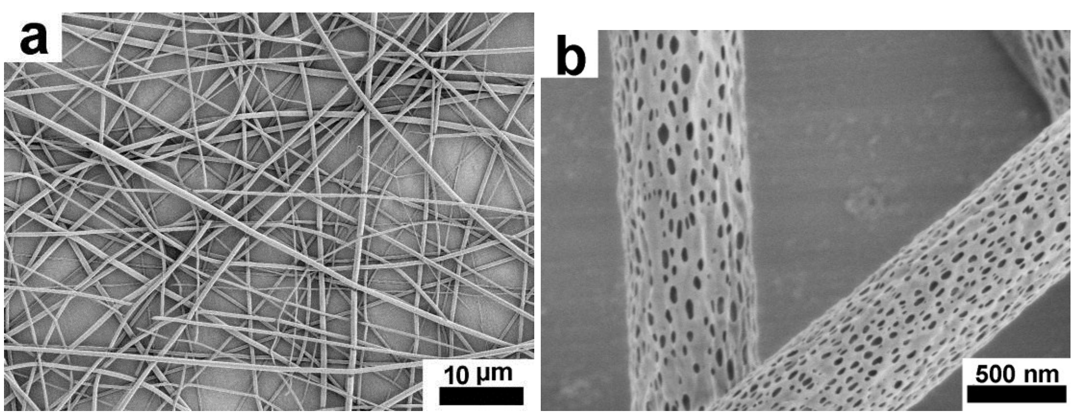


Fig. S1 Scanning electron microscopy (SEM) images of laccase-carrying electrospun fibrous membranes (LCEFMs)

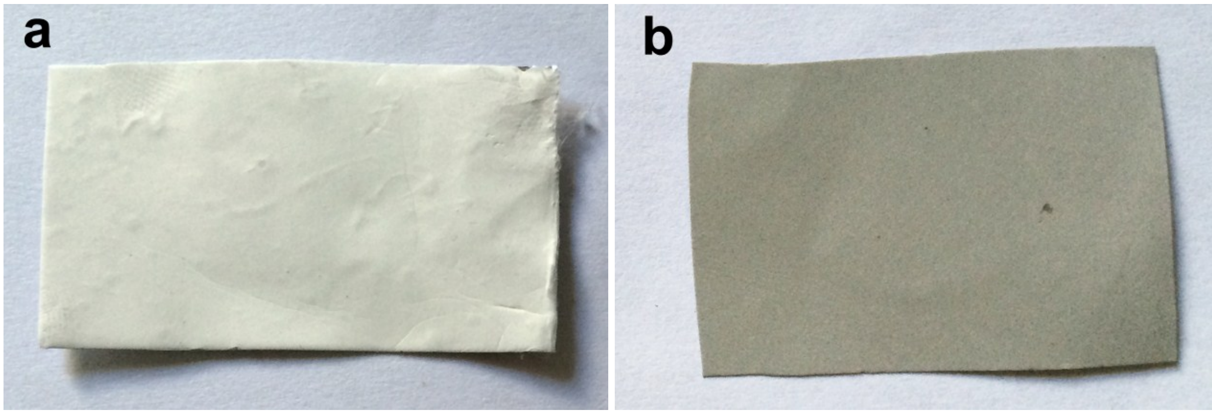


Fig. S2 The digital photos of PDLLA (a) laccase-carrying electrospun fibrous membranes (LCEFMs) and (b) multi-walled carbon nanotubes modified laccase-carrying electrospun fibrous membranes (MWCNTs-LCEFMs)

Electrochemical experiments

The electron transfer properties of the LEEFMs and MWCNTs-LCEMS were characterized by electrochemical impedance spectroscopy (EIS). The membranes were directly deposited on a polished Pt electrode via electrospinning. Then EIS measurements were conducted in a three-electrode system with membrane-deposited Pt electrode (square, 0.5×0.5 cm^2) as the working electrode, a saturated calomel electrode as the reference electrode, and a bare Pt electrode as the counter electrode. All measurements were performed on a CHI660D electrochemical workstation (Shanghai Chenhua Device Company, China) at 25 °C, with 10 mV AC voltage over the frequency range of 100 Hz–0.1 Hz in 10 mmol L^{-1} of $K_3[Fe(CN)_6]$ solution.

The experimental results were shown in Fig. S3. Generally, the linear part in the Nyquist diagrams corresponds to the diffusion-limited process, while the semicircle portion corresponds to the electron transfer-limited process. The electron transfer resistance (R_{et}) at electrode surface can be obtained by measuring the diameter of the semicircle. As seen from Fig. S3, the R_{et} of the LCEFMs in Nyquist diagrams was about 980 Ω, indicating a huge interfacial resistance of electron transfer. The R_{et} value was decreased to about 400 Ω after the MWCNTs modification, suggesting that the MWCNTs could improve the conductivity and the electron transfer process of LCEFMs. The distributed MWCNTs in the fibers might act as electric wires and make a way for electron transportation. Therefore, the introduction of MWCNTs into the LCEFMs could promote the direct electron transfer between laccase and substrates, and further enhance the catalytic activity of laccase for phenols in water.

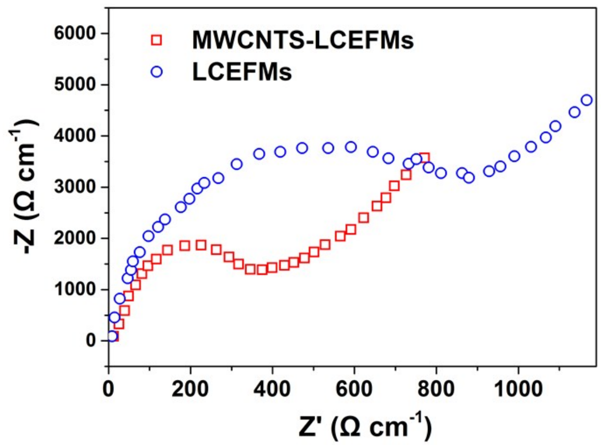


Fig. S3 Nyquist diagrams of the LCEFMs and MWCNTs- LCEFMs.