Supporting Information

Green flexible and wearable biosensor based on carbon nanofibers for sensitive detection of uric acid in artificial urine

Hao Zheng [a,b,c], Xiao Han [b,c], Qiulin Wei [b,c], Xinliang Liu [a], Yao Li [a,b,c] *, Jinghui Zhou [b,c] *

a. Guangxi Key Laboratory of Clean Pulp & Papermaking and Pollution Control, College of Light Industry and Food Engineering, Guangxi University, Nanning 530004, P. R. China.

b. Collaborative Innovation Center for Lignocellulosic Biorefinery, Dalian, Liaoning Province, 116034, P. R. China.

c. College of Light Industry and Chemical Engineering, Dalian, Liaoning Province, 116034, P. R. China.

* To whom correspondence should be addressed.

China. E-mail: liyaodlpu@163.com

China. E-mail: zhoujh@dlpu.edu.cn

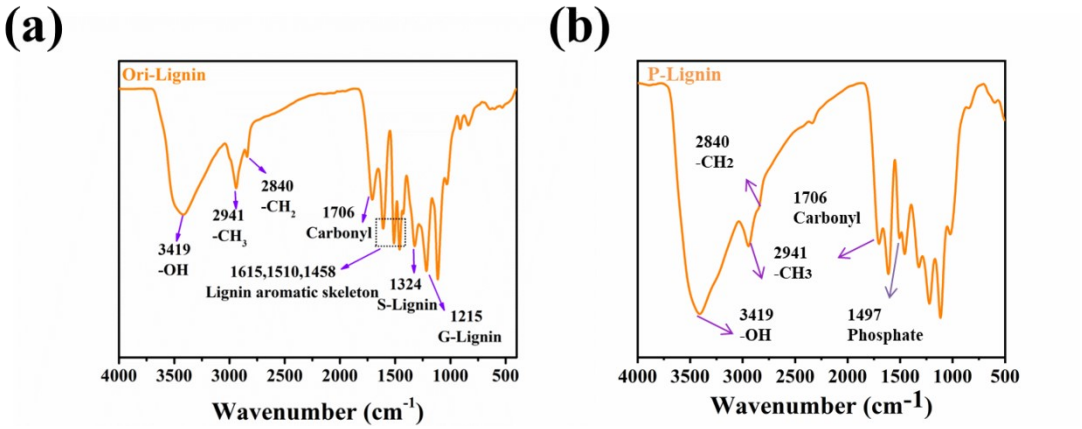

Fig. S1 FTIR spectra of the raw materials (OL) and of these materials subject to phosphoric acid (PL)

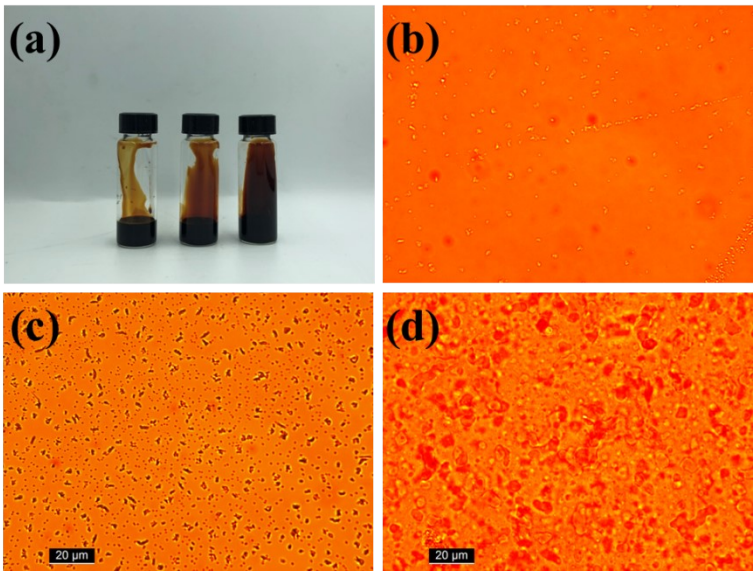

Fig. S2 FTIR spectra of the raw materials (OL) and of these materials subject to phosphoric acid (PL)

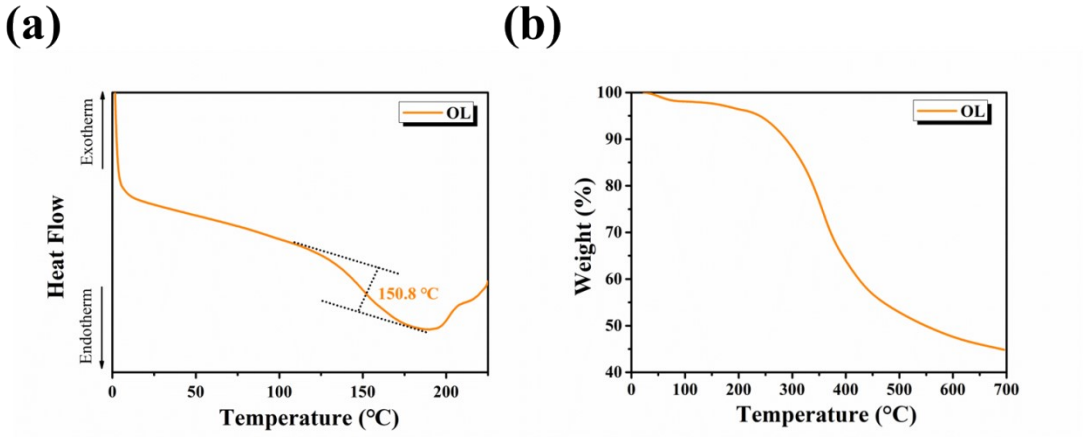

Fig. S3 Basic properties of original lignin (a) DSC spectra and (b) TGA spectra

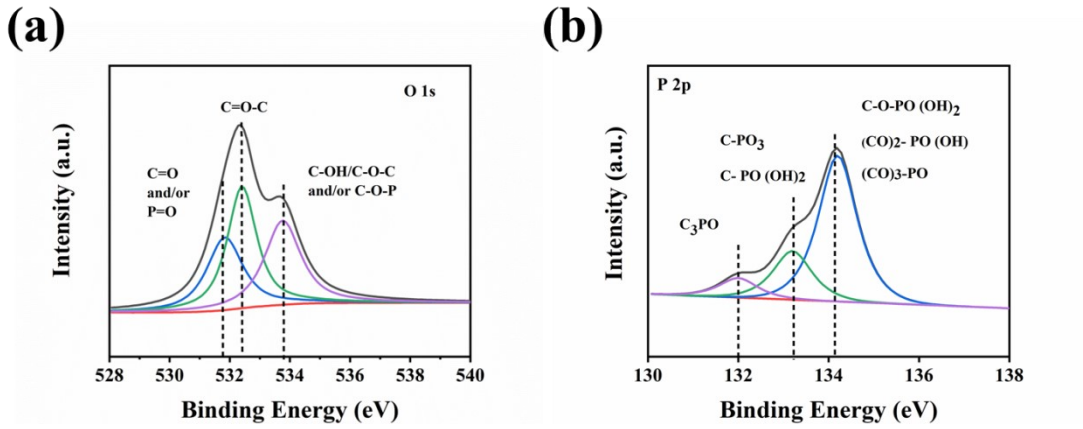

Fig. S4 (a) O 1s and (b) P 2p XPS deconvoluted spectra of CNFs-3 fibers

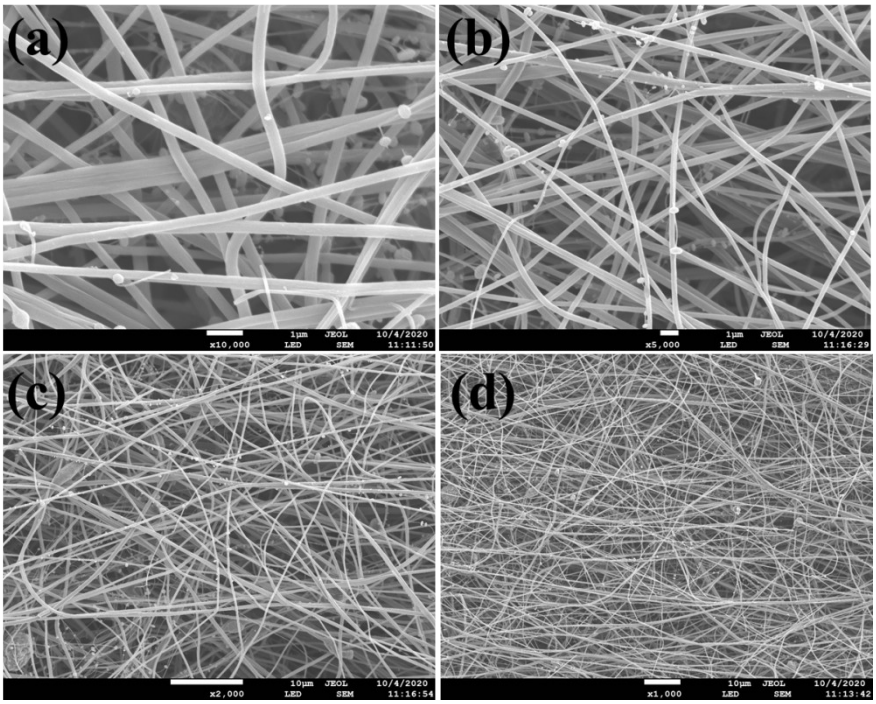

Fig. S5 SEM images of CNFs-3 after a certain compression

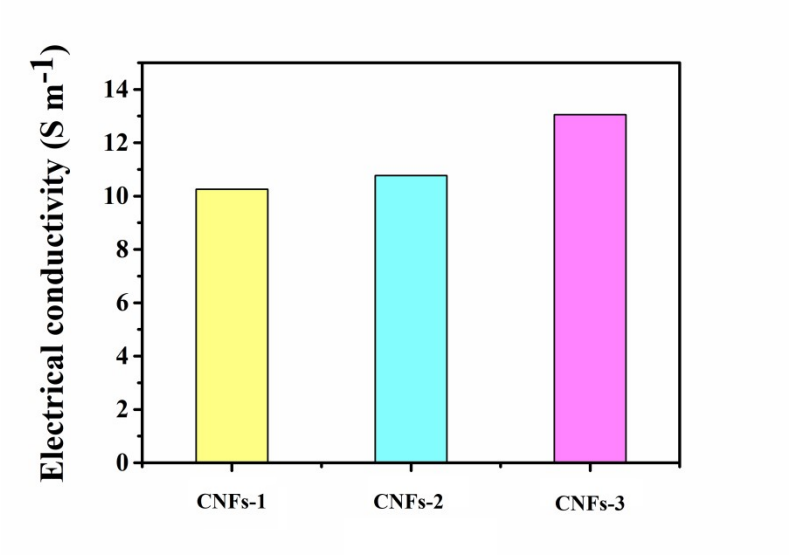

Fig. S6 Electrical conductivity curve of the free-standing carbon nanofibers

As shown in **Fig. S7**, PFs framework can be folded repeatedly without fracture, demonstrating an excellent foldability. The foldability and electrical conductivity of the biomass-based CNFs are shown in Fig. S7b and S7c. Comparing to many other flexible electrode materials which can only bear limited bending, this biomass-based CNFs exhibits a much better mechanical flexibility. Therefore. repeated and continuous physiological monitoring can be achieved. It has a broad application prospect in flexible wearable, electronic skin, flexible sensing and other fields.

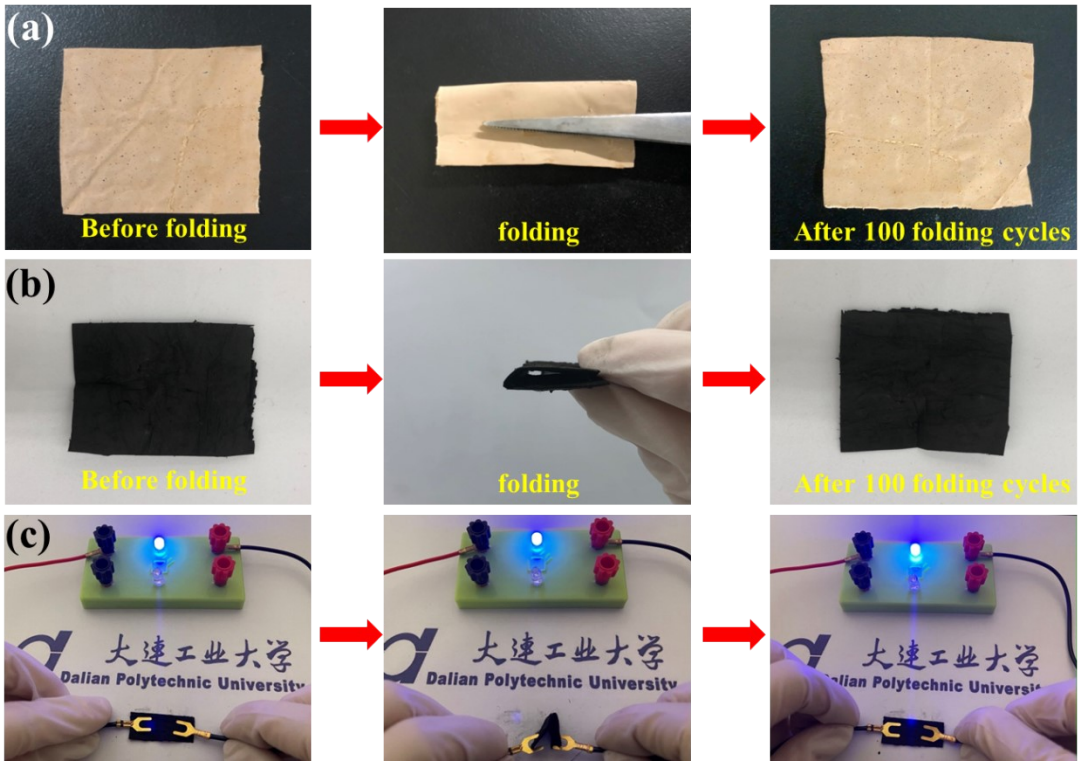

Fig. S7 Optical photographs of nanofibers framework (a) PFs-3, (b) CNFs-3, and (c) a circuit using the composite as an electrical connection to light a LED under the same states.

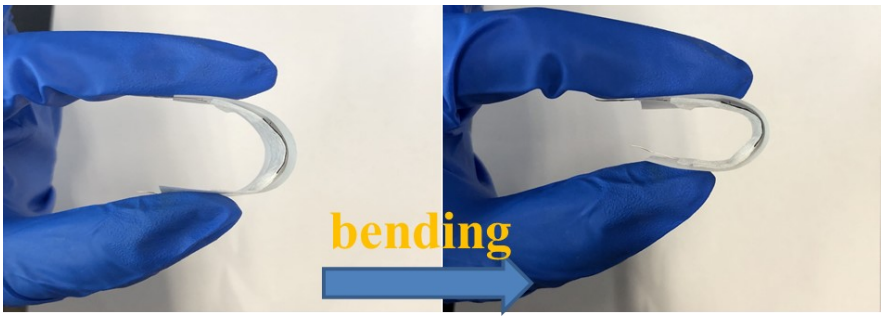

Fig. S8 Flexibility and mechanical strength testing of wearable biosensors

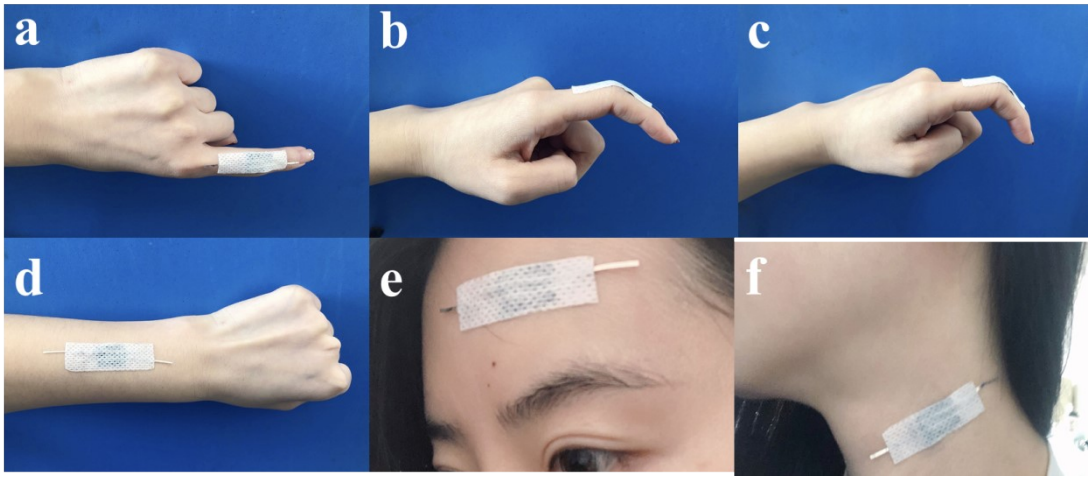

Fig. S9 (a) Demonstration photographs of the wearable biosensors conformably attached on different parts of human body for practical applications.

Table S1 Element analysis of PFs with different phosphorylated lignin content

Sample	Element content (wt%)						
	C	H	O	N	S	H/C	O/C
PFs-1	45.92	5.392	45.36	1.74	0.588	0.1174	0.98
PFs-2	46.63	5.507	45.54	1.8	0.523	0.118	0.97
PFs-3	50.7	5.976	42.11	0.92	0.295	0.1178	0.83