

Supplementary Information

Test strips for naked eye screening of tetracycline based on Iron (III) impregnated alginate/polyacrylonitrile nanofibers

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Supplementary Figures

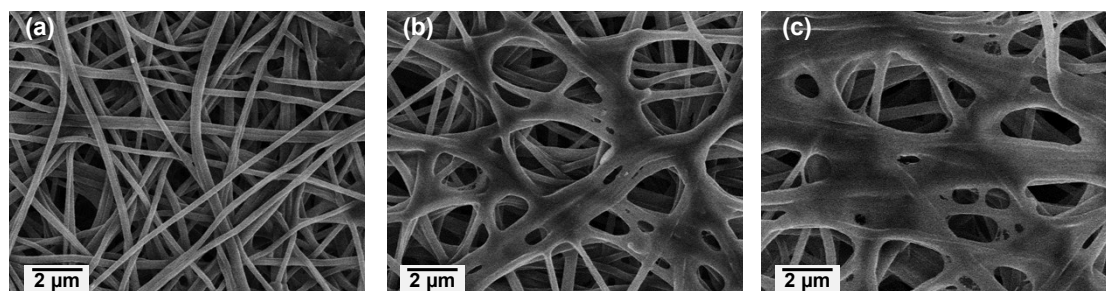


Fig.S1. The FE-SEM images of (a) A_{0.1}PAN, (b) A_{0.5}PAN, and (c) A_{0.9}PAN NMs.

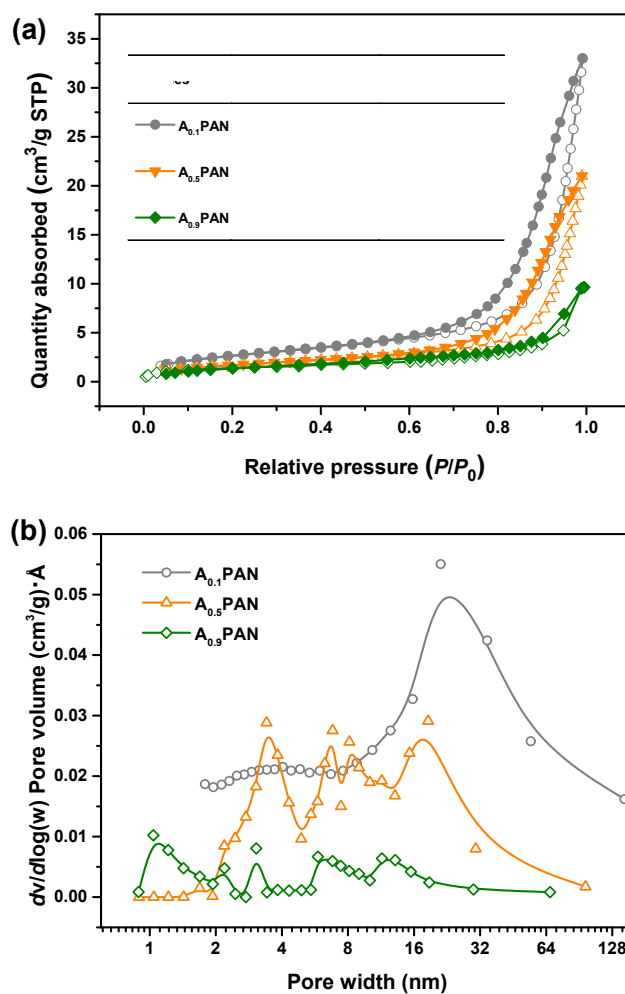


Fig. S2. (a) the N_2 adsorption-desorption isotherms of $A_{0.1}PAN$, $A_{0.5}PAN$ and $A_{0.9}PAN$. Pore size distribution analysis of the relevant nanofibers based on the BJH method are displayed in (b).

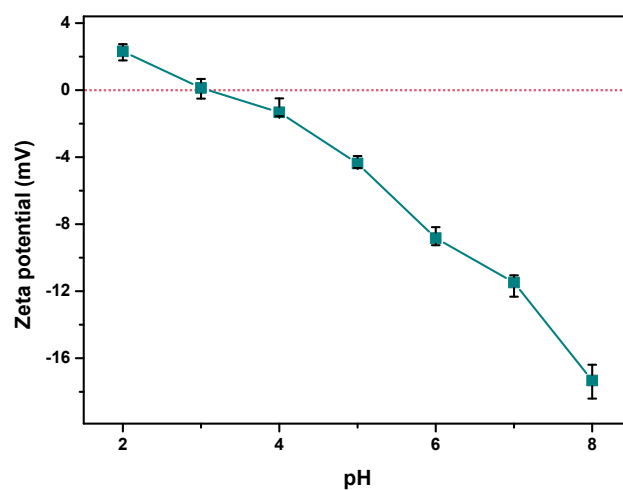


Fig. S3. The zeta potential of $CS_{0.01}$ as a function of pH values.

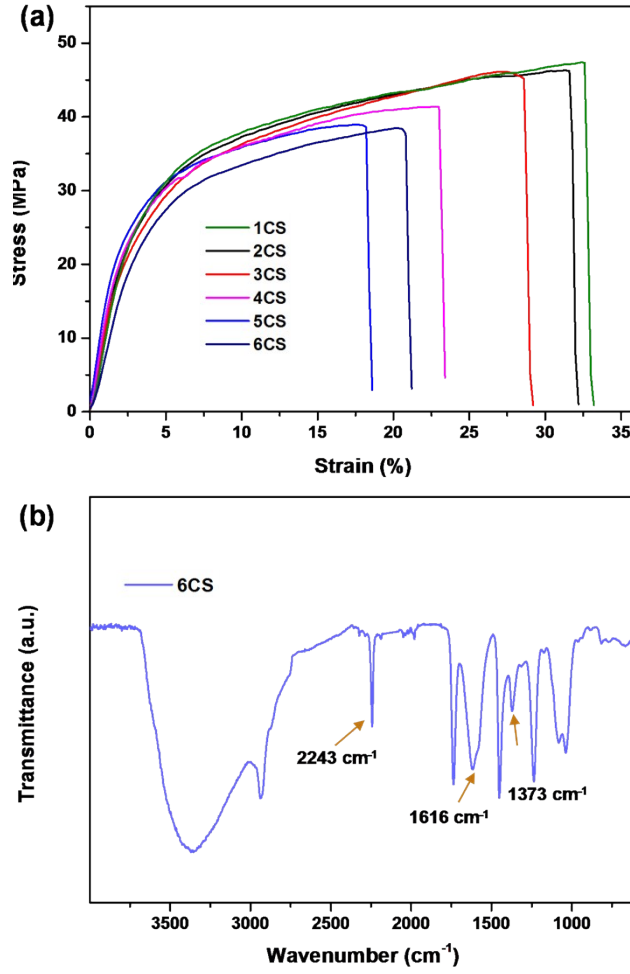


Fig. S4. (a) stress-strain curves of control sample after each repeat using time. (b) is of the FT-IR spectrum of control sample after reuse 6 times.

Supplementary calculation process

Step 1. Calculate L' , a' , c' , and h' based on the L^* , a^* , and b^* data readout by an App named ColorUtility.

$$L' = L^*$$

$$a' = (1 + G) \times a^*$$

$$b' = b^*$$

$$C'_{ab} = \sqrt{a'^2 + b'^2}$$

$$h'_{ab} = \arcsin(b'/a')$$

$$G = 0.5 \times \left(1 - \sqrt{\frac{\bar{C}_{ab}^{*7}}{\bar{C}_{ab}^{*7} + 25^7}} \right)$$

Step 2. Calculate $\Delta L'$, $\Delta C'_{ab}$, $\Delta H'_{ab}$

$$\Delta L = L'_1 + L'_2$$

$$\Delta C_{ab}' = C_{ab,1}' - C_{ab,2}'$$

$$\Delta H_{ab}' = 2\sqrt{C_{ab,1}' \cdot C_{ab,2}'} \sin\left(\frac{\Delta h_{ab}'}{2}\right)$$

Step 3. Calculate S_L , S_C , S_H , and T .

$$S_L = 1 + \frac{0.015(L' - 50)^2}{\sqrt{20 + (L' - 50)^2}}$$

$$S_c = 1 + 0.045\bar{C}_{ab}'T$$

$$T$$

$$= 1 - 0.017\cos\left(h_{ab}' - 30^\circ\right) + 0.24\cos\left(2h_{ab}'\right) + 0.32\cos\left(3h_{ab}' + \right)$$

$$R_T = -\sin(2\Delta\theta)R_C$$

$$\Delta\theta = 30\exp\left\{-\left[\left(h_{ab}' - 275^\circ\right)/25\right]^2\right\}$$

$$R_C = 2\sqrt{\frac{\bar{C}_{ab}'^7}{\bar{C}_{ab}'^7 + 25^7}}$$

Supplementary table

Table S1. The L^* , a^* , and b^* values of Fe_{0.001}A_xPAN before and after interacted with 2000µg/kg TC.

C _[alginate] (wt.%)	Samples					
	Control samples			Detected samples		
	L^*	a^*	b^*	L^*	a^*	b^*
0	93	0	0	94	0	0
0.1	84	1	10	65	10	46
0.3	84	-1	18	31	30	36
0.5	82	1	29	50	28	50
0.7	83	1	8	66	8	56
0.9	187	1	13	64	14	5

Table S2. The L^* , a^* , b^* , H, S, and V values of $\text{Fe}_y\text{A}_{0.3}\text{PAN}$ before and after interacted with $2000\mu\text{g/kg}$ TC.

$C_{[\text{Fe(III)}}]$ (M)	Samples											
	Control samples						Detected samples					
	L^*	a^*	b^*	H (°)	S (%)	V (%)	L^*	a^*	b^*	H (°)	S (%)	V (%)
10^{-4}	94	0	0	0	0	94	94	0	0	0	0	93
10^{-3}	77	2	53	43	54	76	42	52	51	23	62	84
10^{-2}	81	1	23	46	72	78	46	46	50	21	85	84
10^{-1}	77	-1	18	48	89	78	35	44	39	18	94	65
10^0	70	8	69	49	97	80	30	39	33	17	97	62

Table S3. The L^* , a^* , and b^* values of $\text{CS}_{0.01}$ interacted with $2000\mu\text{g/kg}$ TC under different pH conditions.

pH value	Samples		
	L^*	a^*	b^*
Control	81	-2	35
2	79	-1	33
3	70	5	20
4	63	7	29
5	58	32	53
6	57	34	55
7	69	4	33
8	78	-1	31

Table S4. The L^* , a^* , and b^* values of $\text{CS}_{0.01}$ control and TC reacted sample under optimal detection condition.

$C_{[\text{TC}]}$ ($\mu\text{g/kg}$)	Parameters					
	L^*	a^*	b^*	H (°)	S (%)	V (%)
0	81	-2	35	39	72	78
5	70	15	47	31	70	74
100	70	25	48	29	67	94
500	62	27	60	23	85	82
1000	54	32	51	21	85	94
2000	57	34	55	19	86	92
4000	49	36	55	17	80	64
6000	39	37	36	15	80	48
8000	33	39	39	14	77	48
10000	19	40	37	13	71	32

Table S5. Determination of TC levels in real drinking water and milk samples.

Samples	TC ($\mu\text{g/kg}$)		%Recovery	%RSD
	Added	Found ^a		
Drink water	5	5.148 $\pm$ 0.013	102.96	0.78
	50	49.712 $\pm$ 0.033	99.42	2.13
	1000	1002.804 $\pm$ 0.034	100.28	2.66
Milk	5	4.958 $\pm$ 0.075	99.16	3.01
	50	55.826 $\pm$ 0.081	111.65	2.42
	1000	983.614 $\pm$ 0.076	98.36	2.88

^a Average value of five determinations $\pm$ standard deviation