Supporting Information

Colorimetric and Fluorometric Dual-mode Detection of Aniline Pollutant Based on Spiropyran Derivatives

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Content

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Table S1 True and predicted aniline concentration determined by naked eye from color standard cards.

Group 1			**Group 2**		
True	Predicted		True	Predicted	
1.00E+00	1	6.00E-01	5.00E-01	1	6.00E-01
	2	1.00E+00		2	5.00E-01
	3	6.00E-01		3	6.00E-01
	4	1.00E+00		4	1.00E-01
	5	8.00E-01		5	6.00E-01
	Av.	8.00E-01		Av.	4.80E-01
	σ	2.00E-01		σ	2.17E-01
Group 3			**Group 4**		
True	Predicted		True	Predicted	
1.00E-01	1	1.00E-01	1.00E-02	1	5.00E-03
	2	5.00E-02		2	1.00E-02
	3	5.00E-02		3	5.00E-03
	4	1.00E-01		4	5.00E-03
	5	5.00E-02		5	1.00E-03
	Av.	7.00E-02		Av.	5.20E-03
	σ	2.74E-02		σ	3.19E-03
Group 5			**Group 6**		
True	Predicted		True	Predicted	
1.00E-04	1	1.00E-04	1.00E-06	1	1.00E-07
	2	1.00E-05		2	1.00E-06
	3	1.00E-04		3	1.00E-07
	4	1.00E-05		4	1.00E-06
	5	5.00E-05		5	5.00E-07
	Av.	5.40E-05		Av.	5.40E-07
	σ	4.51E-05		σ	4.51E-07

Note: unit mol/L; Av. = Average; σ = Standard deviation

Table S2 True and predicted aniline concentration determined by naked eye from fluorescent standard cards.

Group 1			**Group 2**		
True	Predicted		True	Predicted	
	1	8.00E-01		1	4.00E-01
	2	1.00E+00		2	5.00E-01
	3	8.00E-01		3	6.00E-01
1.00E+00	4	5.00E-01	5.00E-01	4	8.00E-01
	5	1.00E+00		5	5.00E-01
	Av.	8.20E-01		Av.	5.60E-01
	σ	2.05E-01		σ	1.52E-01
Group 3			**Group 4**		
True	Predicted		True	Predicted	
	1	5.00E-02		1	1.00E-02
	2	5.00E-02		2	1.00E-02
	3	1.00E-01		3	5.00E-03
1.00E-01	4	1.00E-01	1.00E-02	4	1.00E-03
	5	1.00E-01		5	5.00E-03
	Av.	8.00E-02		Av.	6.20E-03
	σ	2.74E-02		σ	3.83E-03
Group 5			**Group 6**		
True	Predicted		True	Predicted	
	1	1.00E-04		1	1.00E-07
	2	5.00E-05		2	1.00E-06
	3	8.00E-05		3	5.00E-07
1.00E-04	4	5.00E-05	1.00E-06	4	1.00E-07
	5	2.50E-04		5	5.00E-07
	Av.	1.06E-04		Av.	4.40E-07
	σ	8.32E-05		σ	3.71E-07

Note: unit mol/L; Av. = Average; σ = Standard deviation

Table S3 True and predicted aniline concentration determined by UV-Vis spectrometer.

Group 1			**Group 2**		
True	Predicted		True	Predicted	
	1	4.8142E-02		1	5.0250E-03
	2	4.8553E-02		2	4.9228E-03
	3	5.1576E-02		3	4.9346E-03
5.0000E-02	4	5.0240E-02	5.00E-03	4	4.8008E-03
	5	5.1725E-02		5	5.2034E-03
	Av.	5.0047E-02		Av.	4.9773E-03
	σ	1.6620E-03		σ	1.4946E-04
Group 3			**Group 4**		
True	Predicted		True	Predicted	
	1	4.8848E-04		1	4.9583E-05
	2	5.1119E-04		2	5.0115E-05
	3	4.9069E-04		3	5.0560E-05
5.0000E-04	4	5.0242E-04	5.0000E-05	4	5.0989E-05
	5	5.0898E-04		5	4.9909E-05
	Av.	5.0035E-04		Av.	5.0231E-05
	σ	1.0370E-05		σ	5.5238E-07
Group 5			**Group 6**		
True	Predicted		True	Predicted	
	1	5.0046E-06		1	5.1220E-07
	2	4.9439E-06		2	4.9063E-07
	3	5.0256E-06		3	4.9422E-07
5.0000E-06	4	4.9683E-06	5.0000E-07	4	4.9333E-07
	5	5.0465E-06		5	5.1007E-07
	Av.	4.9978E-06		Av.	5.0009E-07
	σ	4.1726E-08		σ	1.0199E-08
Group 7					
True	Predicted				
	1	5.1583E-08			
	2	4.9828E-08			
	3	4.8772E-08			
5.0000E-08	4	4.9255E-08			
	5	5.1617E-08			
	Av.	5.0211E-08			
	σ	1.3221E-09			

Note: unit mol/L; Av. = Average; σ = Standard deviation

Table S4 True and predicted aniline concentration determined by FL spectrometer.

Group 1			**Group 2**		
True	Predicted		True	Predicted	
	1	9.4104E-02		1	1.1010E-02
	2	1.0929E-01		2	1.0810E-02
	3	9.6406E-02		3	9.9700E-03
1.0000E-01	4	1.0041E-01	1.0000E-02	4	9.5740E-03
	5	1.0802E-01		5	1.0210E-02
	Av.	1.0165E-01		Av.	1.0315E-02
	σ	6.7987E-03		σ	5.9312E-04
Group 3			**Group 4**		
True	Predicted		True	Predicted	
	1	1.0460E-03		1	1.0307E-04
	2	1.0435E-03		2	9.9813E-05
	3	1.0906E-03		3	1.0313E-04
1.0000E-03	4	1.0118E-03	1.0000E-04	4	9.9963E-05
	5	9.9780E-04		5	1.0144E-04
	Av.	1.0379E-03		Av.	1.0148E-04
	σ	3.5929E-05		σ	1.6072E-06
Group 5			**Group 6**		
True	Predicted		True	Predicted	
	1	1.0259E-05		1	1.0057E-06
	2	1.0072E-05		2	1.0923E-06
	3	1.0330E-05		3	1.0000E-06
1.0000E-05	4	9.9585E-06	1.0000E-06	4	9.9647E-07
	5	9.9260E-06		5	9.9773E-07
	Av.	1.0109E-05		Av.	1.0184E-06
	σ	1.7938E-07		σ	4.1443E-08
Group 7			**Group 8**		
True	Predicted		True	Predicted	
	1	9.6650E-08		1	1.8390E-08
	2	1.1092E-07		2	2.0000E-08
	3	1.1318E-07		3	1.6770E-08
1.0000E-07	4	1.1092E-07	1.0000E-08	4	2.1056E-08
	5	1.0126E-07		5	2.3721E-08
	Av.	1.0659E-07		Av.	1.9987E-08
	σ	7.2140E-09		σ	2.6451E-09

Note: unit mol/L; Av. = Average; σ = Standard deviation

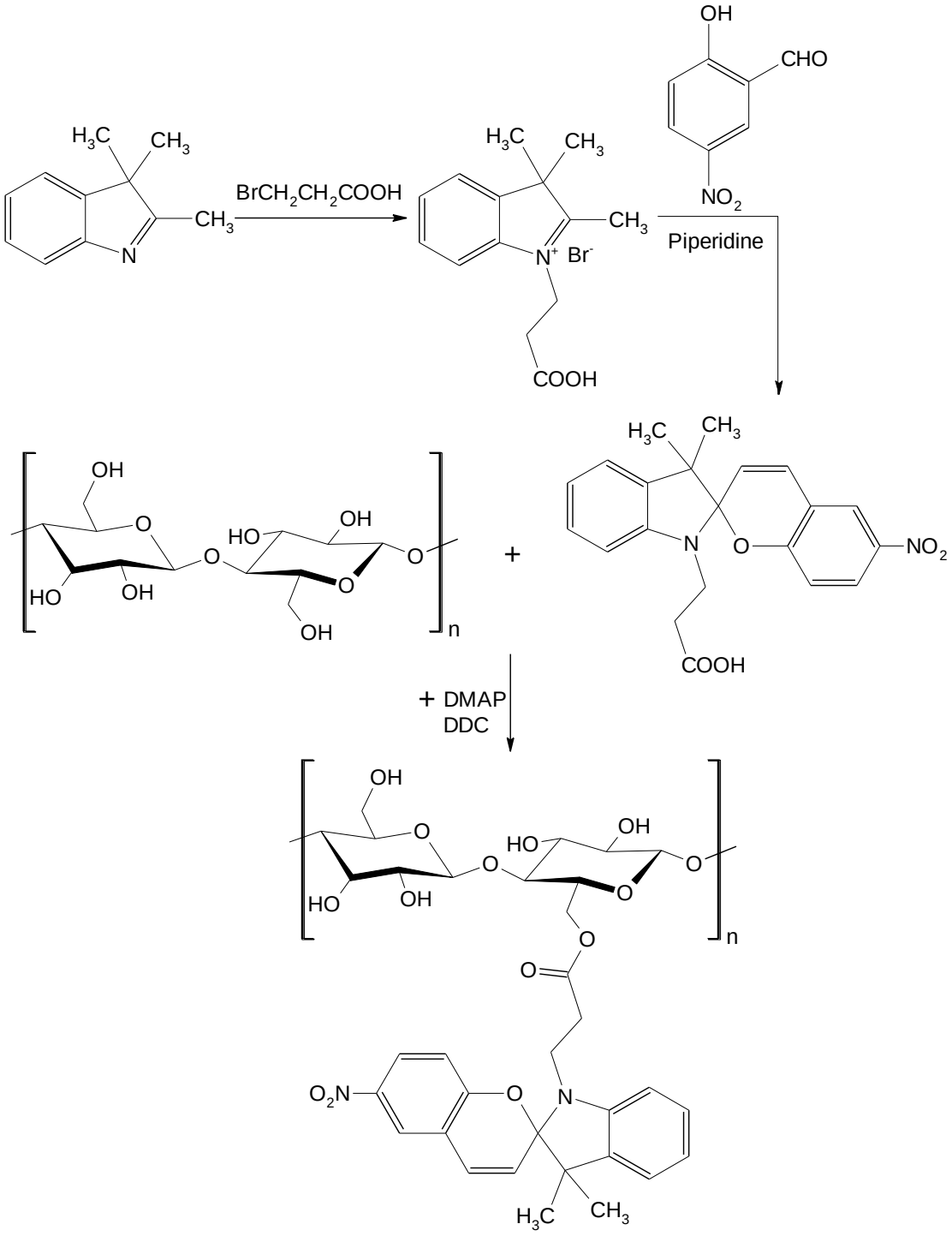

Fig. S1 Synthetic routine of the SPCOOH and SP-cellulose.

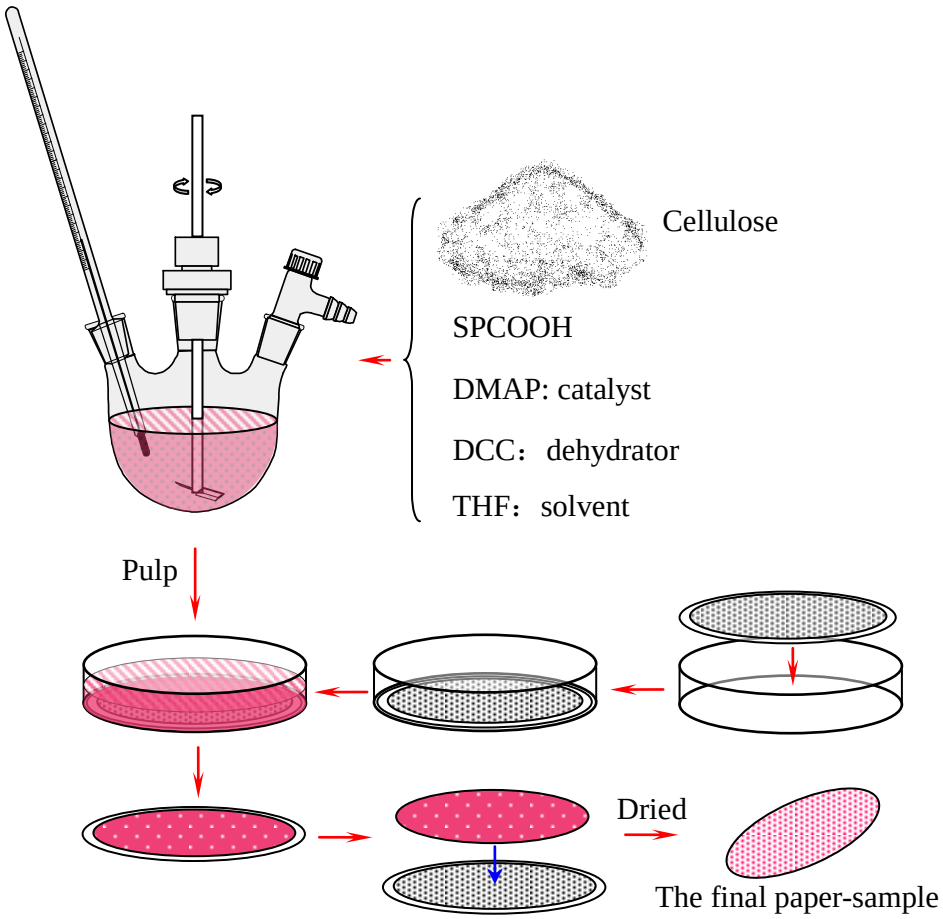

Fig. S2 Preparation procedure of the SP-cellulose paper sample.

The content of SP in the SP-cellulose is calculated using the following method:

$$w\% = (1.90\text{g} - 0.381\text{g}) / (10\text{g} + 1.90\text{g} - 0.381\text{g}) = 13\%$$

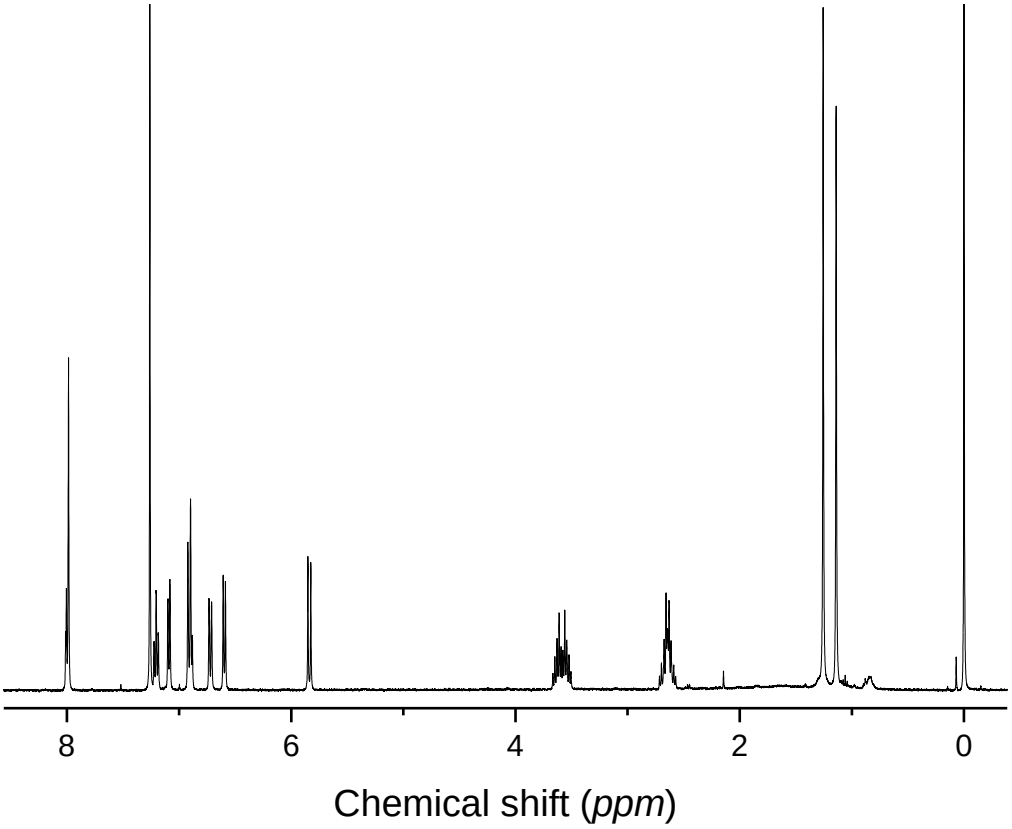

Fig. S3 ^{1}H NMR spectrum (in $CDCl_3$) of the SPCOOH

^{1}H NMR (400 MHz, $CDCl_3$) δ, aromatic protons, 8.06 – 7.91 (m, 2H), 7.20 (t, J = 7.2 Hz, 1H), 7.09 (d, J = 6.7 Hz, 1H), 6.90 (t, J = 7.9 Hz, 2H), 6.72 (d, J = 9.3 Hz, 1H); olefinic protons, 6.60 (d, J = 7.8 Hz, 1H), 5.84 (d, J = 10.4 Hz, 1H); N**CH_2-**, 3.59 (dtd, J = 22.0, 14.9, 7.1 Hz, 2H), 2.78 – 2.49 (m, 2H); -**CH_3**(×2), 1.26 (s, 3H), 1.14 (s, 3H).

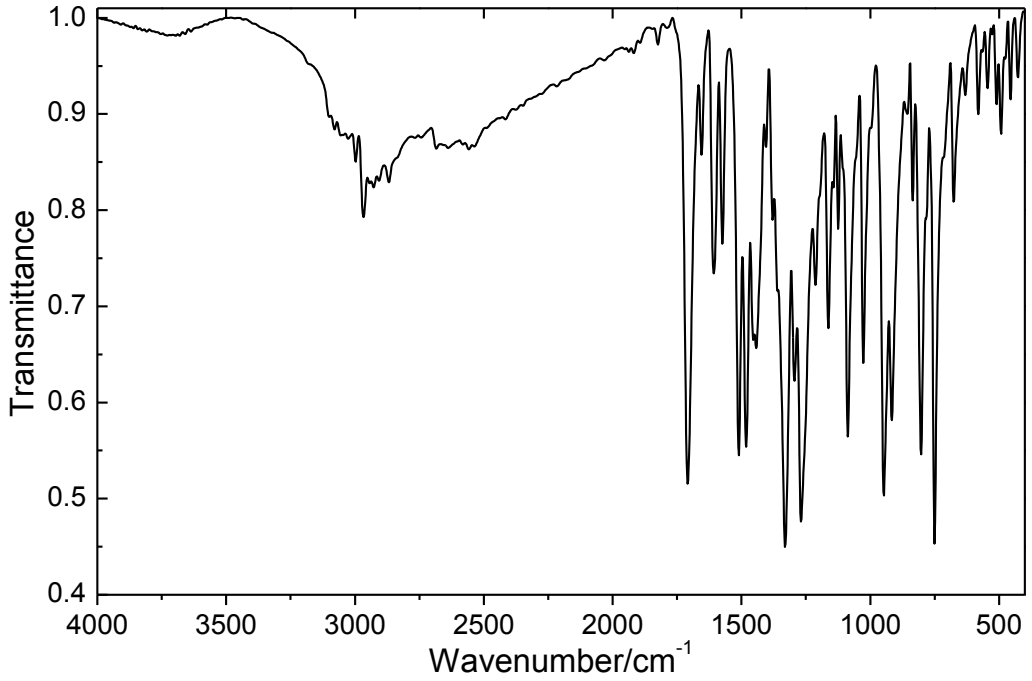

Fig. S4 FTIR spectrum of the SPCOOH.