

Supplementary Information

A Water Soluble Naphthalimide-Based Chemosensor for Fluorescent Detection CN^- in Pure Water and Its Application in Practical Samples

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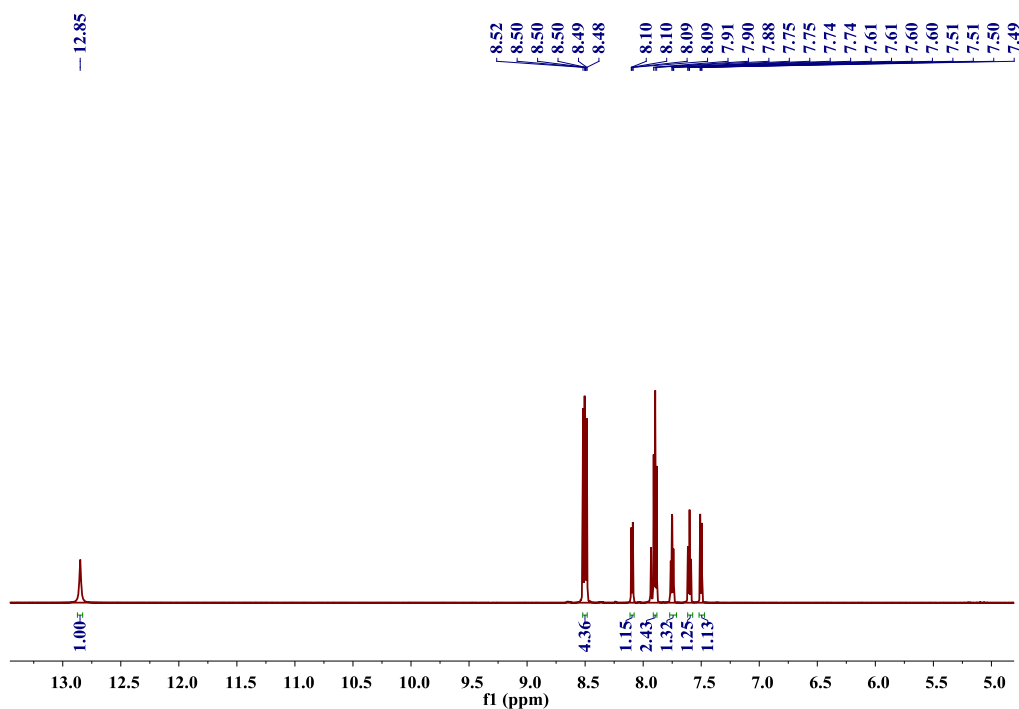


Figure S1. ^1H NMR spectrum (600 MHz, $\text{DMSO}-d_6$) of DA.

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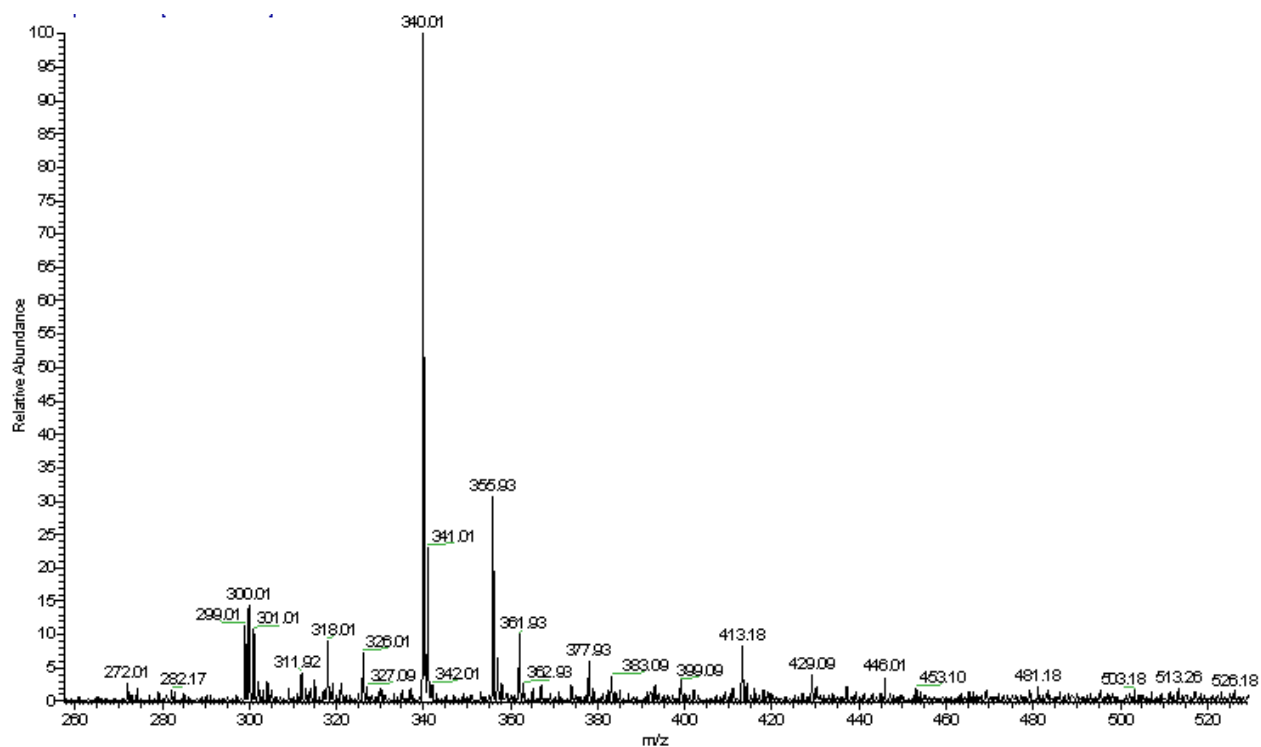


Figure S2. ESI-MS spectrum of DA.

Determination of association constant

The association constants (K_a) were calculated based on the fluorescent titration curve of the probes with ions. Association constants were determined by a nonlinear least squares fit of the data with the following equation S1 as referenced elsewhere. I is the observed fluorescence intensity of DA at the fixed concentrations of CN^- ; I_{max} and I_{min} are the corresponding maximum and minimum, respectively:

$$\log \frac{I - I_{min}}{I_{max} - I} = \log K_a + \log [CN^-], K_a = 6.08 \times 10^5 \text{ L mol}^{-1} \quad (S1)$$

The detection limit of the sensor DA with CN⁻

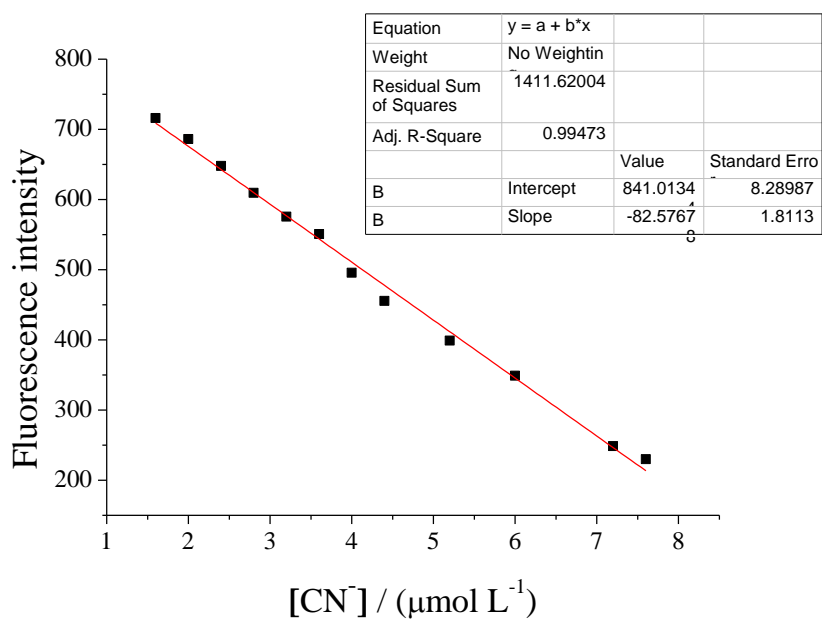


Figure S3. The photograph of the fluorescent spectral linear range.

The detection limit (LOD) of fluorescence spectra result of the analysis as follows:

Linear equation: $Y = -82.5768X + 841.013$

$R^2 = 0.99473$

$S = 8.26 \times 10^7$

$$\delta = \sqrt{\frac{\sum (F_i - F_0)^2}{N - 1}} = 0.356 \quad (N = 30)$$

$K = 3$

$LOD = K \times \delta / S = 1.38 \times 10^{-8} \text{ mol L}^{-1}$

Table S1. Analytical results of the CN^- in tap water

Added $\text{CN}^- / (\mu\text{mol L}^{-1})$	Found / $(\mu\text{mol L}^{-1})$	Recovery / %	RSD (n = 3) / %
0	not detected		
0.5	0.483	96.6	3.6
1.0	1.036	103.6	1.2
2.0	1.953	97.65	4.1
4.0	3.948	98.7	2.4

RSD: relative standard deviation.

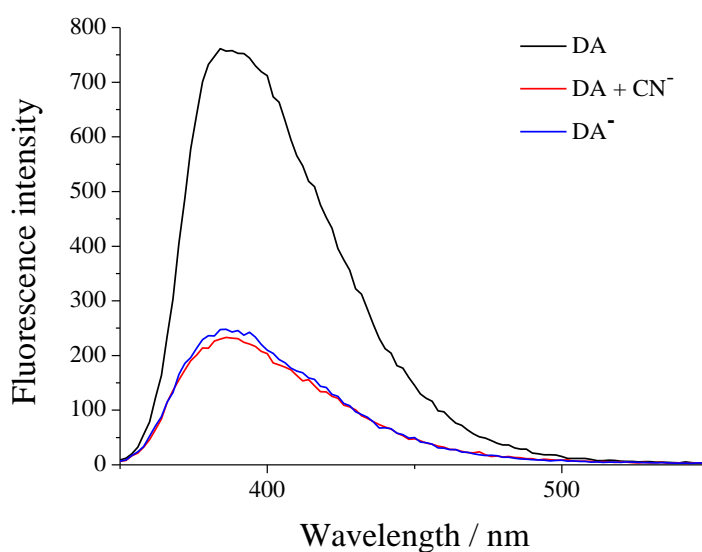


Figure S4. Fluorescence spectra of DA ($20 \mu\text{mol L}^{-1}$), DA + CN^- (5 equiv. of CN^-) and DA^- ($20 \mu\text{mol L}^{-1}$) in pure water media ($\lambda_{\text{exc}} = 315 \text{ nm}$).