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Electronic Supplementary Information

Highly sensitive fluorescent sensing for water based on poly(*m*-aminobenzoic acid)

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Experimental Section

Acetonitrile and THF were obtained from Kemiou Chemical Reagent (Tianjin, China). BMA, ethanol and cyclohexane were purchased from North Medical Chemical Reagent (Tianjin, China). Persulfate was purchased from North Medical Chemical Reagent (Tianjin, China). Deionized water (>18.2 M□□cm) was obtained from a Millipore Milli-Q purification system. All the reagents were at least of analytical grade. The monomer MPA was purified by recrystallization from ethanol and water. All organic solvents were dried prior to use. N,N-dimethylformamide (DMF) was distilled and then stored over molecular sieves (3A). The treatment procedure of N-methyl pyrrolidone (NMP) is as same as that of DMF. Acetonitrile was passed over a column of alumina

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followed by storage over molecular sieves (3A). Ethanol was pre-dried over KOH prior to storage over molecular sieves (3A). The water contents in NMP, THF, ethanol and acetonitrile solution were determined with the Karl Fisher method. Fluorescent emission spectra were recorded on a F-4600 spectrofluorometer (Shimadzu, Japan). The molecular weights and polydispersity indexes (PDI) of the PMBA were analyzed by gel permeation chromatography (GPC) using a HPLC Waters 510 pump using a series of monodisperse polystyrenes (PS). Tetrahydrofuran (THF) was used as the solvent for the GPCs. ^{1}H NMR spectrum was recorded on a Bruker DMX 500-MHz spectrophotometer in DMSO-d_6 solvent. Fluorescence quantum yield of the polymer was measured in dilute ethanol, and calculated by using anthrancence as standards.

PMBA were synthesized by chemical oxidation following a procedure for polyaniline synthesis [1, 2]: In a typical experiment, 0.431 g of MPA was added into 60.0 mL of de-ionized water under stirring at room temperature, followed by the addition of 0.011g of persulfate ammonium. The mixture was kept for 48h under stirring. After that, a large amount of precipitates were gradually obtained. The resulted precipitates were washed with de-ionized water by centrifugation, and then dried under vacuum condition at 4 ℃ for characterization and further use. GPC analysis: $M_n = 1.5 \times 10^4$ g mol^{-1}, PDI = 4.23. PMBA was characterized with^{1}H-NMR (500 MHz, DMSO-d6): δ 12.55 (br, COOH), δ 7.170(S, Ar-H), δ 7.12-7.06 (q, Ar-H), δ 6.77-6.75 (d, Ar-H), δ 5.32 (br, NH). Figure S1 showed the ^{1}H-NMR spectra of PMBA.

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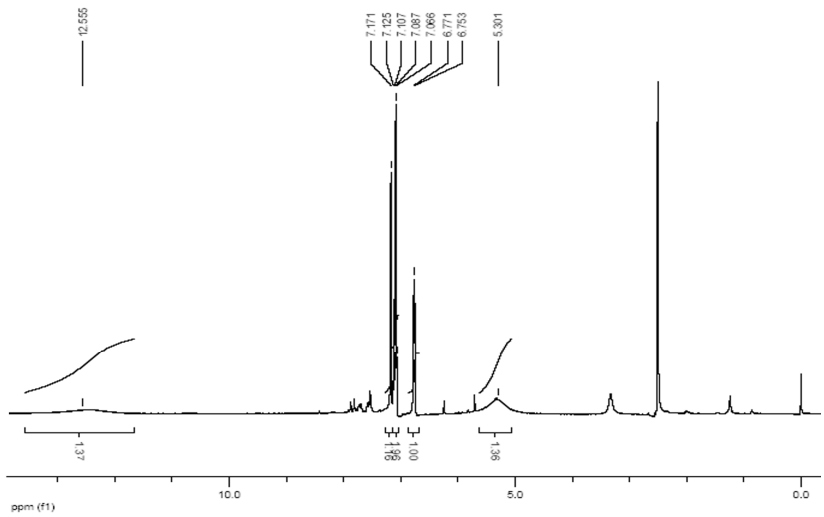

Fig. S1 ^{1}H NMR spectra of PMBA

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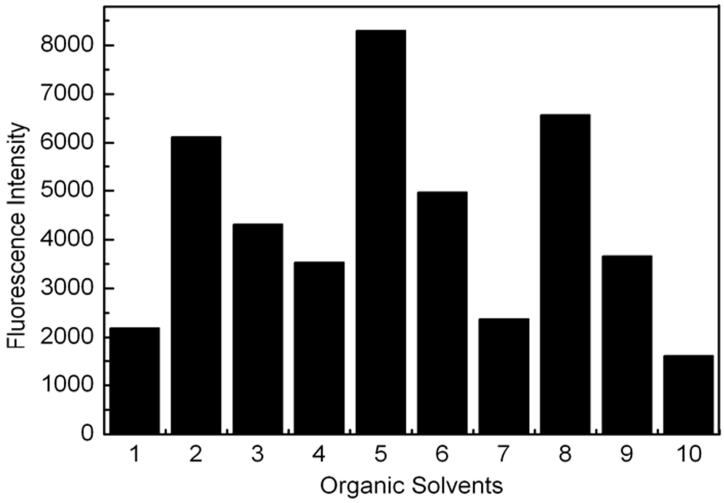

Fig. S2 Fluorescence emission intensity of PMBA in different organic solvents. (1) Cyclohexane (E_T30 = 30.9); (2) THF (E_T30 = 37.4); (3) acetic ether (E_T30 = 38.1); (4) acetone (E_T30 = 42.2); (5) DMF (E_T30 = 43.2); (6) acetonitrile (E_T30 = 45.6); (7) ethanol (E_T30 = 51.1); (8) NMP (E_T30 = 42.2); (9) glycol (E_T30 = 56.3); (10) glycerin (E_T30 = 57.0).

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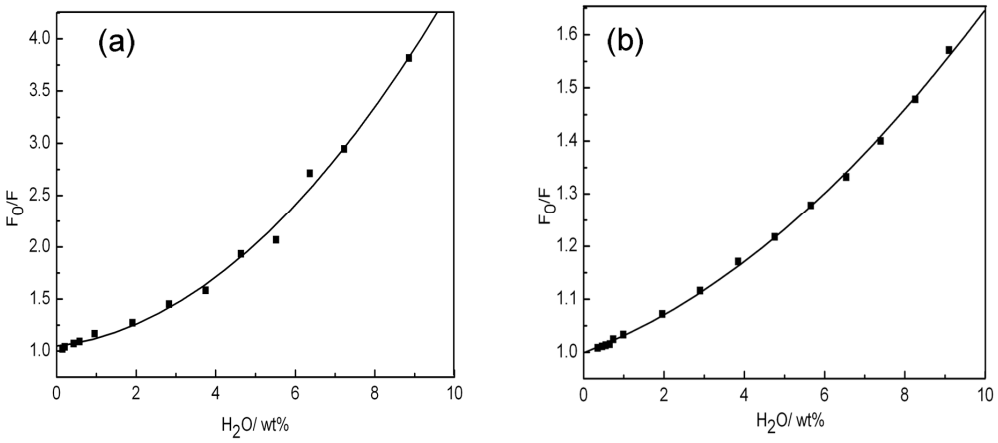

Fig. S3 The Stern-volmer plot of PMBA in NMP (a) and ethanol (b)

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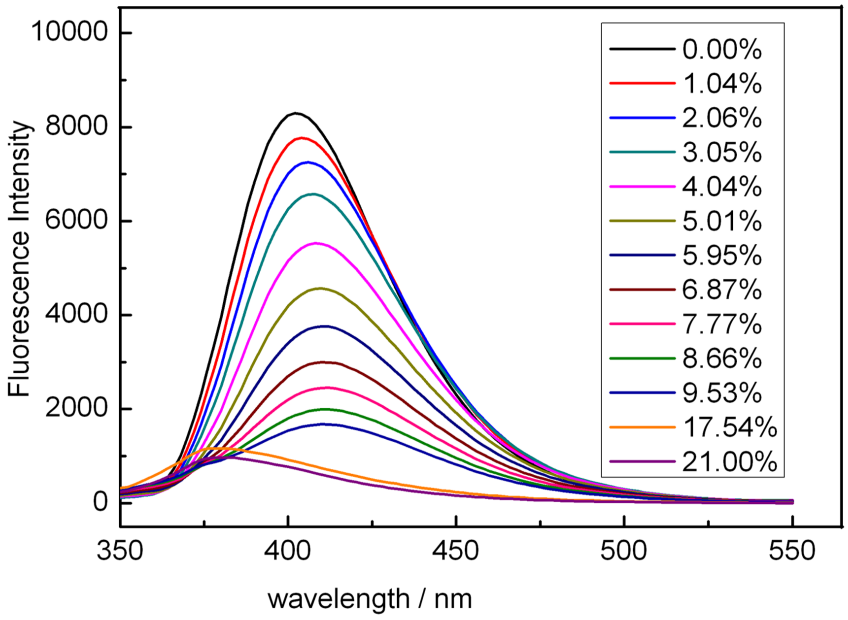

Fig. S4 Fluorescence emission spectra (λex = 335nm) of PMBA (c = 3.6× 10^{-6} M in monomer repeat units) upon addition of water in DMF.

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Table 1. Particle size measurements (nm) based on dynamic light scattering before and after the addition of water

Solvent	DMF	NMP	Ethanol	acetonitrile
Before addition of water	161	120	136	140
After addition of water	241	190	187	199

Reference

1. E. N. Konyushenko, J. Stejskal, I. Šeděnková, M. Trchová, I. Sapurina, M. Cieslar, J. Prokeš, *Polym. Int.*, 2006, **55**, 31.
2. H. J. Ding, M. X. Wan, I. Y. Wei, *Adv. Mater.*, 2007, **19**, 465.