Electronic Supplementary Information

A novel fluorescent aptasensor for thrombin detection: using poly(*m*-phenylenediamine) rods as an effective sensing platform

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Experimental Section

The chemically synthesized oligonucleotide sequence was purchased from Shanghai Sangon Biotechnology Co. Ltd. (Shanghai, China). DNA concentration was estimated by measuring the absorbance at 260 nm. Thrombin was bought from Sigma (U.S.A.). Bovine serum albumin (BSA) and human IgG antibody were from Dingguo Biotech (Beijing, China). All the other chemicals were purchased from Aladin Ltd. (Shanghai, China) and used as received without further purification. The water used throughout all experiments was purified through a Millipore system. Fluorescent emission spectra were recorded on a RF-5301PC spectrofluorometer (Shimadzu, Japan). All measurements were done in 20 mM Tris-HCl buffer (pH 7.4, containing 100 mM NaCl, 5 mM KCl and 5 mM $MgCl_2$). TA sequence is given below:

5'-TCTCTCAGTCCGTGGTAGGGCAGGTTGGGGTGACT-FAM-3' (FAM is a

fluorescein-based dye)

PMPD rods were prepared as follows: In a typical experiment, 0.06 mL of 0.5 M APS aqueous solution was mixed with 0.84-mL N-methylpyrrolidone (NMPD) at room temperature, followed by the addition of 0.1 mL of 0.1M MPD aqueous solution under shaking. After that, a large amount of precipitates were gradually observed. The resulting precipitates were washed with water by centrifugation twice first, and then redispersed in water and stored at 4 ℃ for characterization and further use. Scanning electron microscopy (SEM) measurements were made on a XL30 ESEM FEG scanning electron microscope at an accelerating voltage of 20 kV. Zeta potential measurements were performed on a Nano-ZS Zetasizer ZEN3600 (Malvern Instruments Ltd., U.K.).

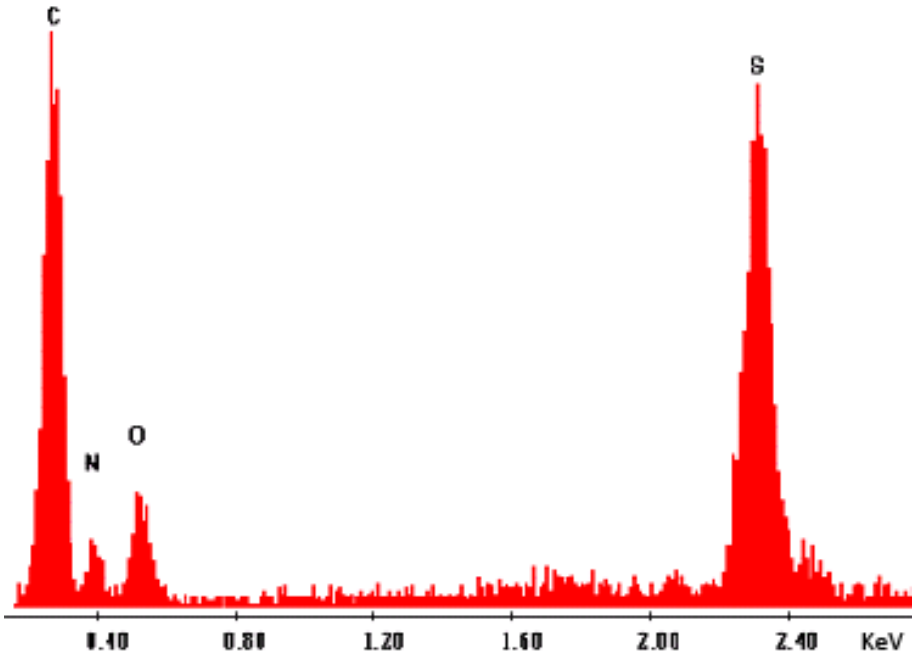

Fig. S1 EDS of the PMPD rods thus formed.

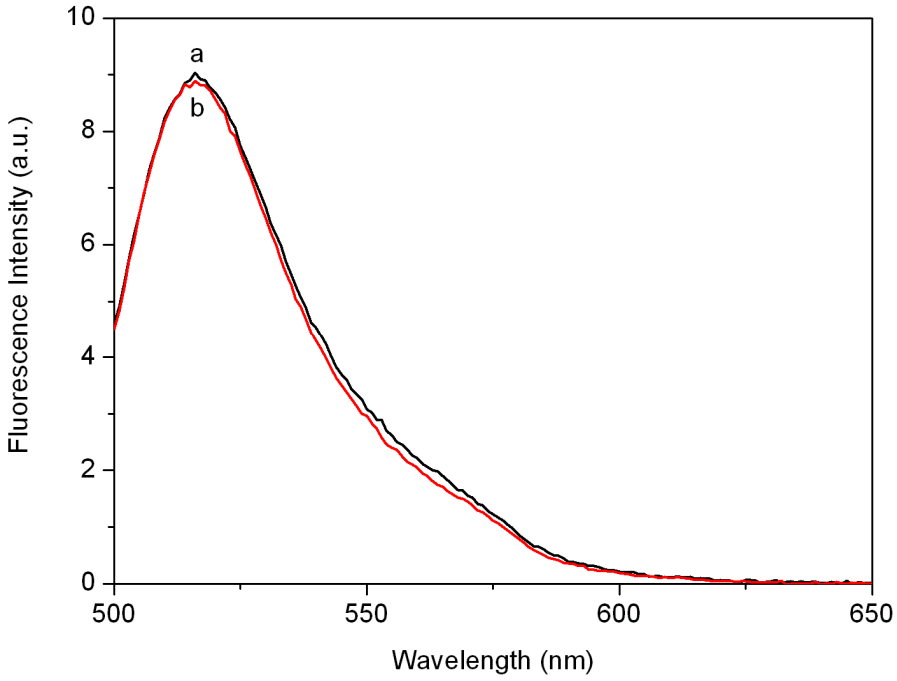

Fig. S2 Fluorescence spectra of (a) 20 nM TA + 4-μL PMPD rods and (b) the supernatant of (a) after removing PMPD rods by centrifugation. All measurements were done in 20 mM Tris-HCl buffer (pH 7.4, containing 100 mM NaCl, 5 mM KCl and 5 mM $MgCl_2$).

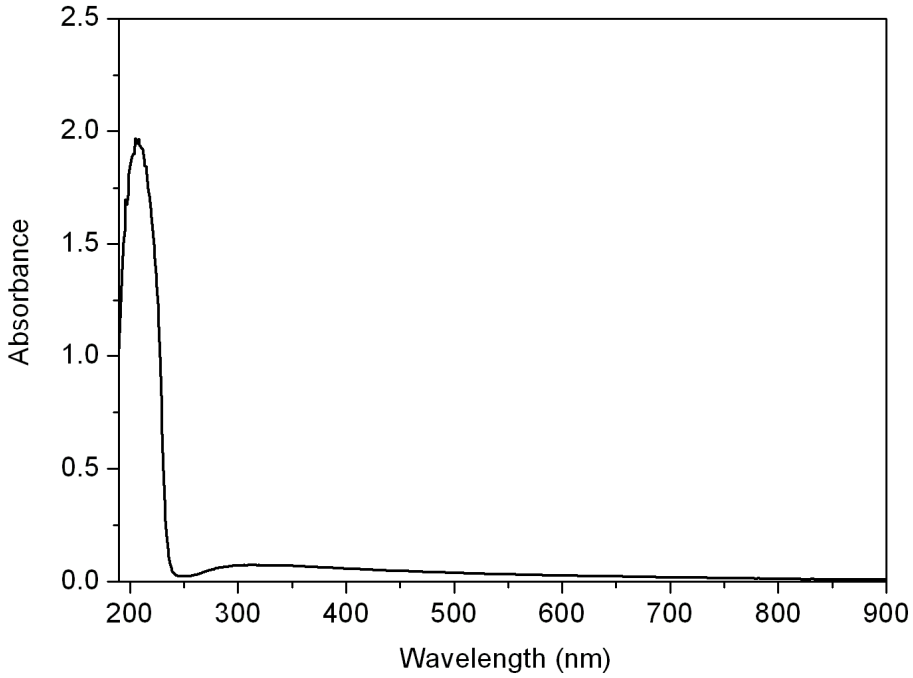

Fig. S3 Absoprtion spectrum of the aqueous dispersion of PMPD rods.

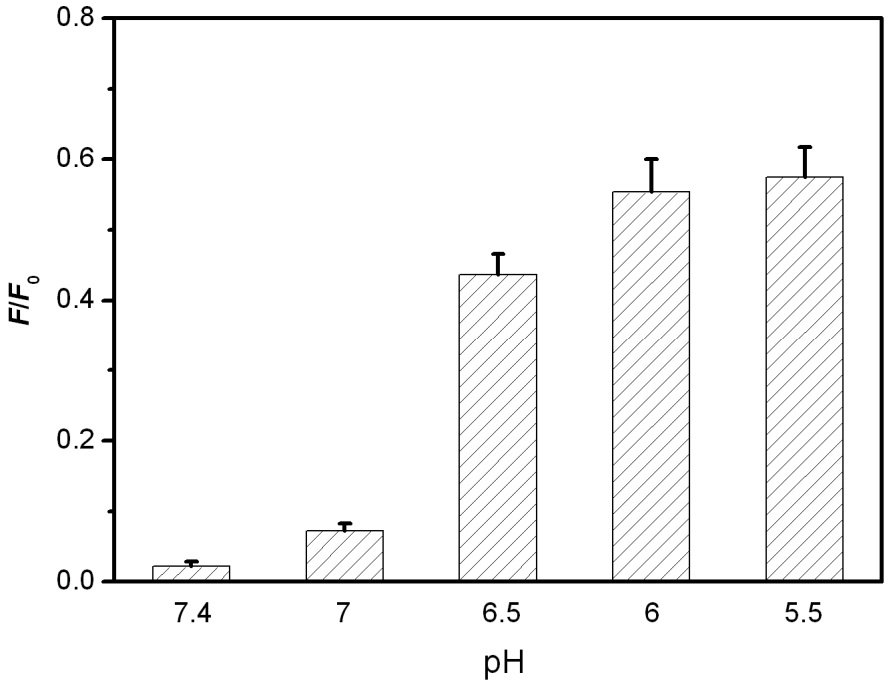

Fig. S4 Fluorescence quenching histograms of TA (50 nM) by 4-μL PMPD rods at different pH values (where F and F_0 are the fluorescence intensity with and without the presence of PMPD).