

Electronic Supplementary Information

Submicrometer-scale polyaniline colloidal spheres: photopolymerization preparation using fluorescent carbon nitride dots as a photocatalyst

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Experimental Section

CCl_4 , 1,2-ethylenediamine (EDA), AgNO_3 and H_2O_2 were purchased from Aladin Ltd. (Shanghai, China), 4-nitrophenol (4-NP) was purchased from Sinopharm Chemical Reagent Co. Ltd and sodium borohydride (NaBH_4) were purchased from Tianjin Fuchen Chemical Corp. All the chemicals were used as received without further purification. The water used throughout all experiments was purified through a Millipore system. Phosphate buffer saline (PBS) was prepared by mixing stock solutions of NaH_2PO_4 and Na_2HPO_4 and a fresh solution of H_2O_2 was prepared daily.

The fluorescent CNDs were prepared follow our previous work by polymerization of CCl_4 and EDA under reflux heating. In a typical synthesis, 0.69 mL of EDA was added to 1 mL of CCl_4 solution. After that, the mixture was heated to 80 °C for 60 min. The excess precursors and resulting small molecules were removed by dialyzing against water through a dialysis membrane for 1 day. The resultant CNDs were dispersed in water for further characterization and use.

The synthesis of PANICSSs was carried out in a quartz cuvette using CNDs as photocatalyst. 20 μL of CNDs, 20 μL of aniline were injected into 3 mL of HCl (0.3 M) aqueous solution in the quartz cuvette. The mixture after ultrasonic disperse for 10 min was placed under high-pressure mercury lamp (50 W) for 2 h to get brown solution.

Ultraviolet-visible (UV-vis) absorption spectra were recorded on a UV5800 spectrophotometer. Scanning electron microscopy (SEM) measurements were made on a XL30 ESEM FEG scanning electron microscope at an accelerating applied

potential of 20 kV. Transmission electron microscopy (TEM) measurements were made on a HITACHI H-8100 EM (Hitachi, Tokyo, Japan) with an accelerating applied potential of 200 kV. The sample for TEM characterization was prepared by placing a drop of the dispersion on carbon-coated copper grid and dried at room temperature. Fourier transform infrared (FTIR) spectroscopic measurements were taken on a Bruker Vertex 70 Fourier transform spectrometer. Fluorescence emission spectra were recorded on a Shimadzu RF-5301 spectrofluorophotometer (Shimadzu Corporation, Kyoto, Japan).

Electrochemical measurements were performed with a CHI 660D electrochemical analyzer (CH Instruments, Inc., Shanghai). A conventional three-electrode cell was used, including a glassy carbon electrode (GCE, geometric area = 0.07 cm²) as the working electrode, a Ag/AgCl (3 M KCl) electrode as the reference electrode, and platinum foil as the counter electrode. All potentials given in this work were referred to the Ag/AgCl electrode. All the experiments were carried out at ambient temperature. The suspension of AgNPs-PANICSs was dropped onto the pre-polished mirror like surface of GCE. Chitosan (0.5 wt %) was used as fixative to form a strong film to modify the electrode.

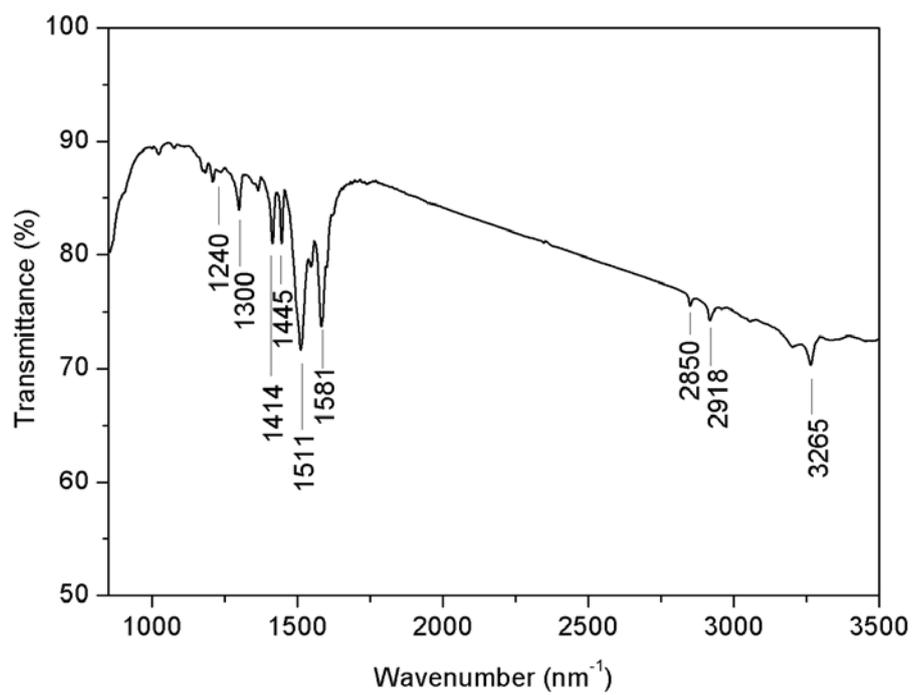


Fig. S1 FTIR spectra of the resulting photopolymerization product.

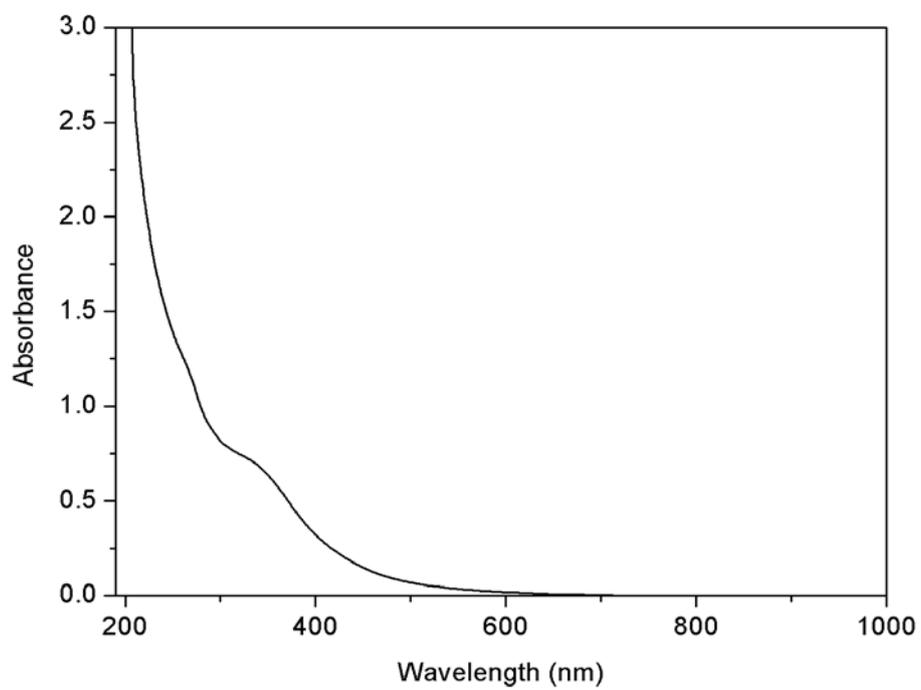


Fig. S2 UV-vis absorption spectra of the aqueous dispersions of CNDs.

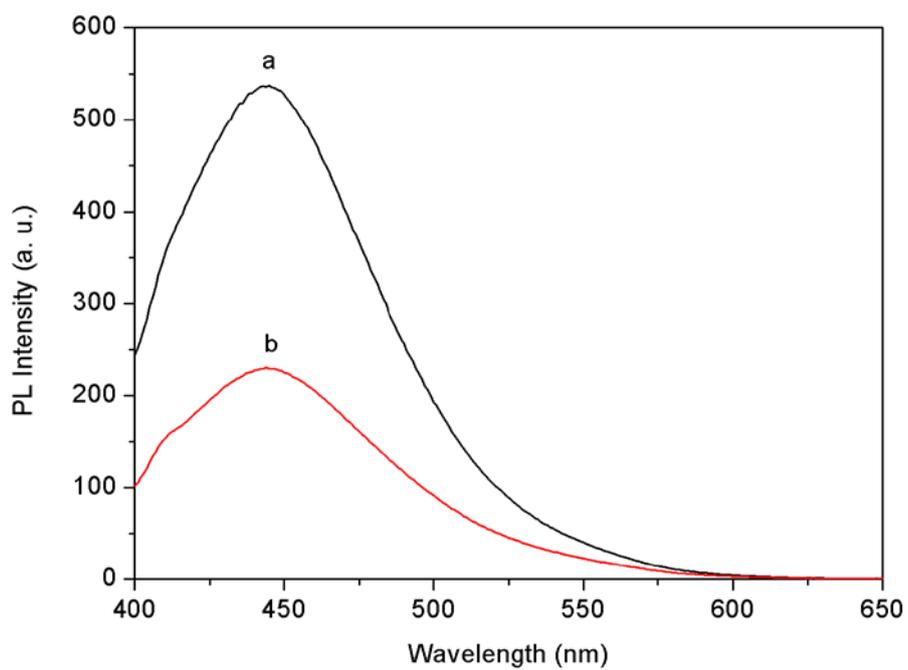


Fig. 3 PL emission spectra of CNDs-aniline mixture (a) before and (b) after 2-h UV irradiation.

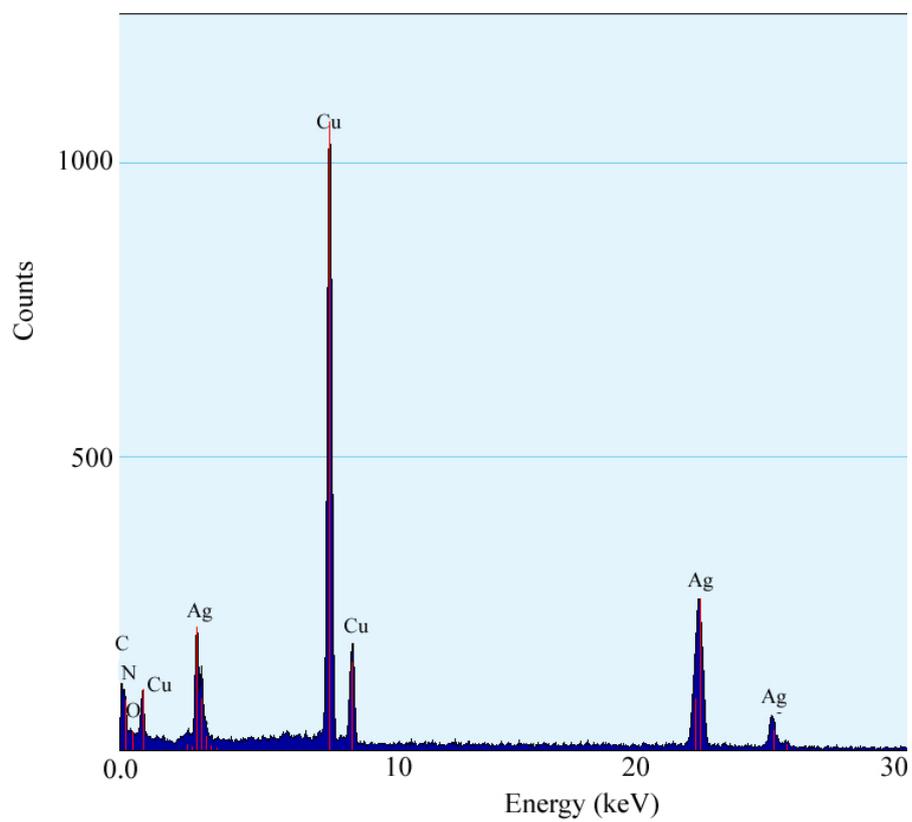


Fig. S4 The corresponding energy-dispersed spectrum of PANICSS after incubation with an aqueous AgNO_3 solution.