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Electronic Supporting Information

Classical Oxidant Induced Chemiluminescence of Fluorescent Carbon Dots

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Supporting Information

1. The preparation of carbon dots

1g PEG 1500 and 15 mL glycerine were pretreated with microwave to form clean and homogeneous solution. 1g serine was injected following. The mixture was further treated by microwave oven for 10 min. The color of the solution changed to brown. And the solution exhibited strong fluorescence under UV irradiation. The as-prepared carbon dots were purified by dialysis (The cut-off of the dialysis membrane equivalent to Mw ~ 2000). The carbon dots solution was then concentrated by rotary evaporator to 10 mL and diluted with water before their using in the CL experiment.

It should be pointed out that microwave treatment of PEG 1500 and glycerine in the absence of serine brought out rather weak and irregular fluorescence emission. The pure glycerine solution after treatment remained clear and very weak photoluminescence was observed. Hence, the bright photoluminescence should be attributed to the formed carbon dots.

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2. Instruments and characterization

The CL kinetic curves were recorded by a BPCL luminescence analyzer (Institute of Biophysics, Chinese Academy of Sciences, Beijing, China). The flow injection CL signal was measured with a LumiFlow LF 800 detector (NITI ON, Funabashi, Japan). Transmission electron microscopy image was recorded by a JEM 2010 electron microscope (JEOL, Japan). UV-vis absorption was characterized by a UV-vis spectrophotometer (UV 3900, Hitachi, Japan). The fluorescence spectrum and CL spectrum were measured with a fluorescence spectrophotometer (F7000, Hitachi, Japan). Electron paramagnetic resonance (EPR) spectra were measured on a Model JES-FA200 spectrometer (JEOL, Tokyo, Japan). Fourier transform infrared (FTIR) spectrum was recorded on a PerkinElmer 100 FTIR spectrometer (Massachusetts, USA). The X-ray photoelectron spectrum (XPS) was measured by a PHI Quantera SXM^{TM} Scanning X-ray Microprobe^{TM} using Al-Kα as the exciting source (1486.6eV) and binding energy calibration was based on C 1s at 284.8 eV.

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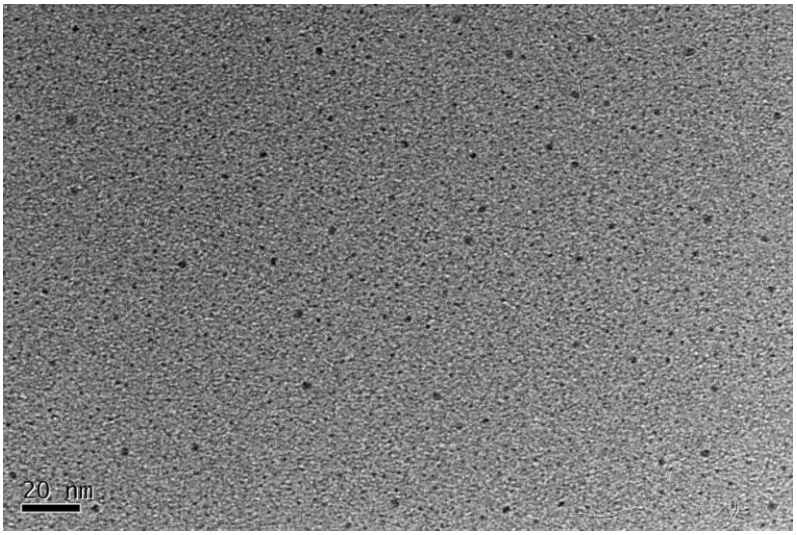

Figure S1. TEM image of the carbon dots

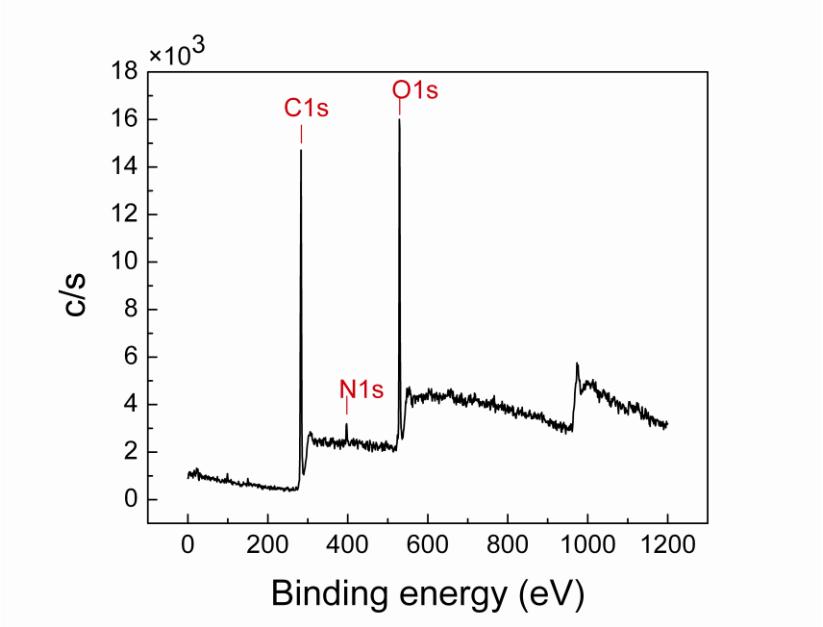

Figure S2. X-ray photoelectron spectrum of carbon dots.

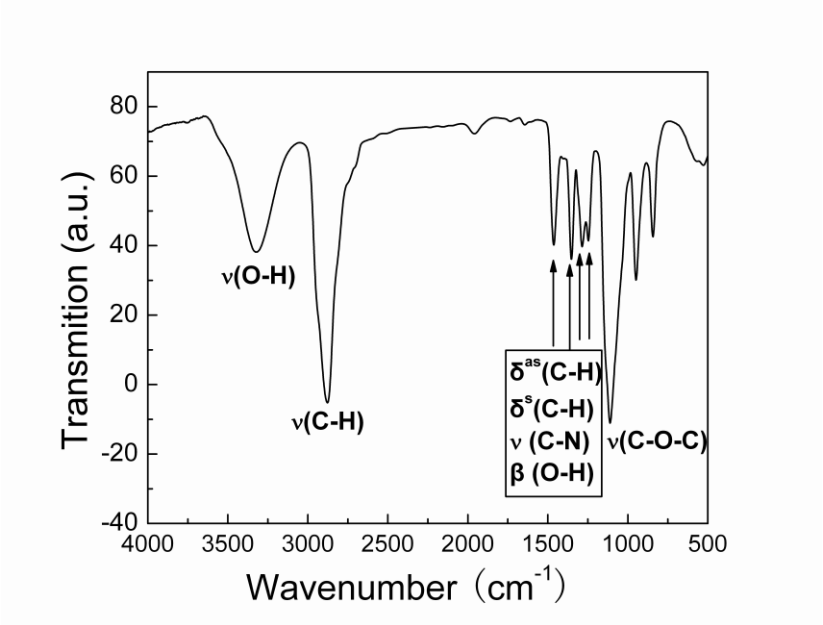

Figure S3. The IR spectrum for the carbon dots prepared from serine.

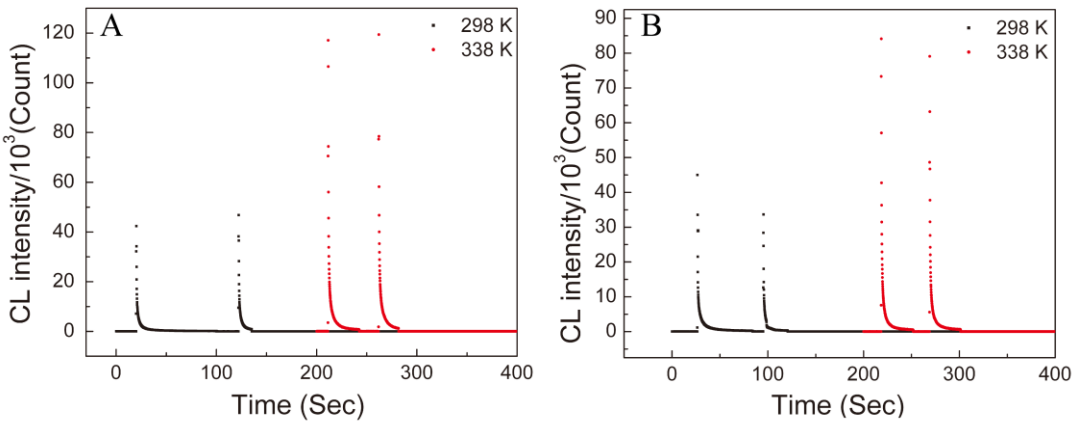

Figure S4. The CL kinetic curve of carbon dots-$KMnO_4$ system (A) and carbon dots-cerium(IV) system (B) at 298 K and 338 K, respectively. The concentration of $KMnO_4$ and cerium(IV) is 2×10^{-3} M and 1×10^{-3} M. 0.05 M H_2SO_4 was the CL reaction media. Carbon dots were in a dilution of 1:20. The peaks were carried out in

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duplicate.

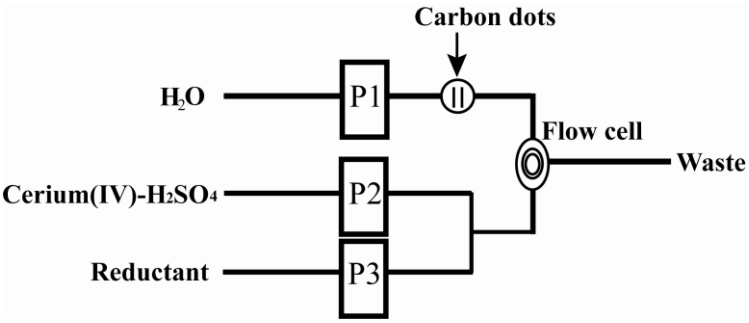

Figure S5. The flow injection manifolds of the carbon dots-cerium(IV) system. P1, P2 and P3 stand for three peristaltic pumps using for solution delivery.

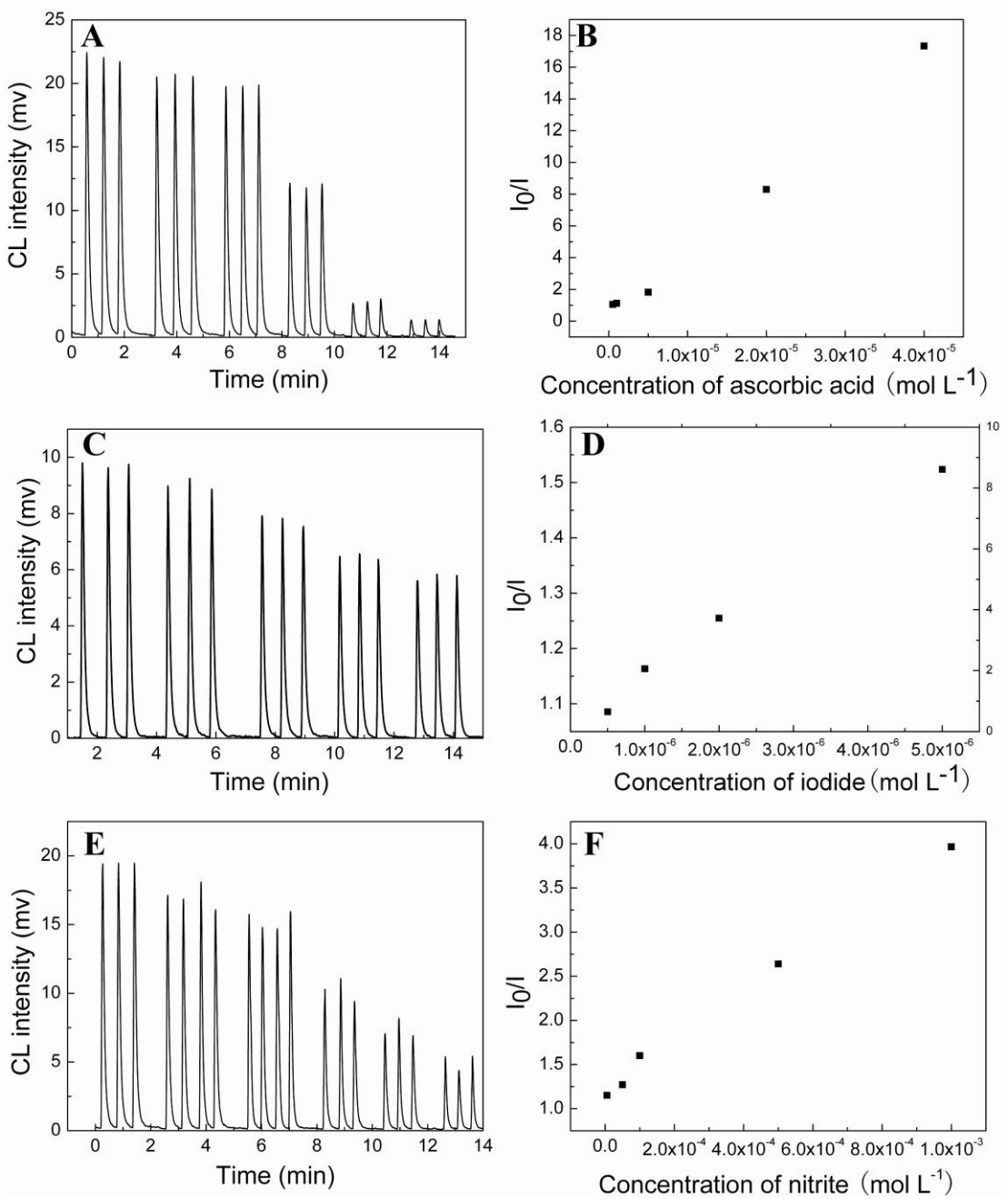

Figure S6. The flow injection signals and standard curves of the carbon dots-cerium (IV) system in the present of ascorbic acid (A and B), iodide (C and D), nitrite (E and F).

The ratio of the initial CL intensity I_0 of carbon dots-cerium (IV) system to the CL intensity I at a given concentration of reductant, I_0/I, was proportional to the

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concentration of reduatant. The dependence of I_0/I on the concentration of reductant was coincident to the Stern-Volmer equation ($I_0/I = 1 + Ksv[Q]$).

For ascorbic acid, $I_0/I = 4.17\times10^5$[ascorbic acid]+0.38 R= 0.9975

For iodide ion, $I_0/I = 1.01\times10^5$[iodide ion]+1.056 R= 0.9972

For nitrite, $I_0/I = 2.79\times10^3$ [nitrite]+1.20 R= 0.9977