Supplementary Material

Sustainable and Green Synthesis of Waste-Biomass-Derived Carbon Dots for Parallel and Semi-Quantitative Visual Detection of Cr(VI) and Fe^{3+}

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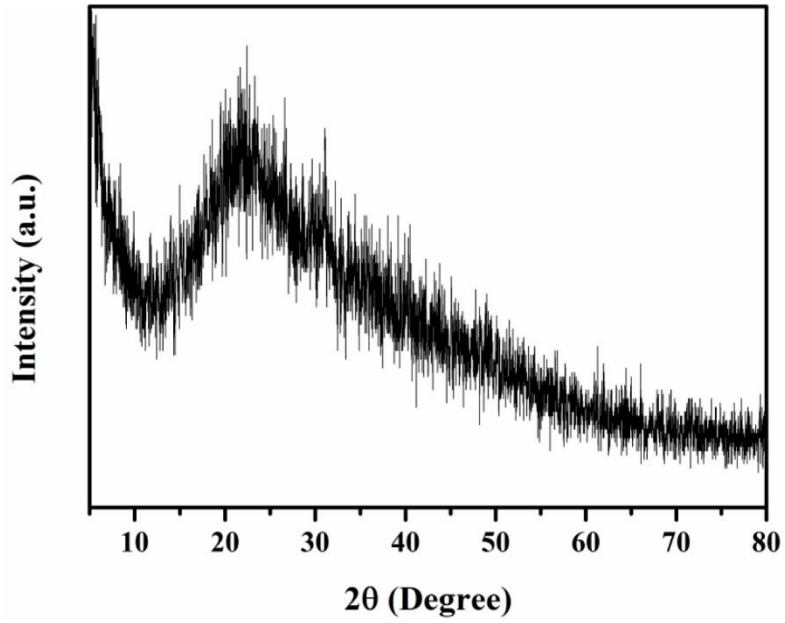

Figure S1. XRD patterns of the prepared FW-CDs.

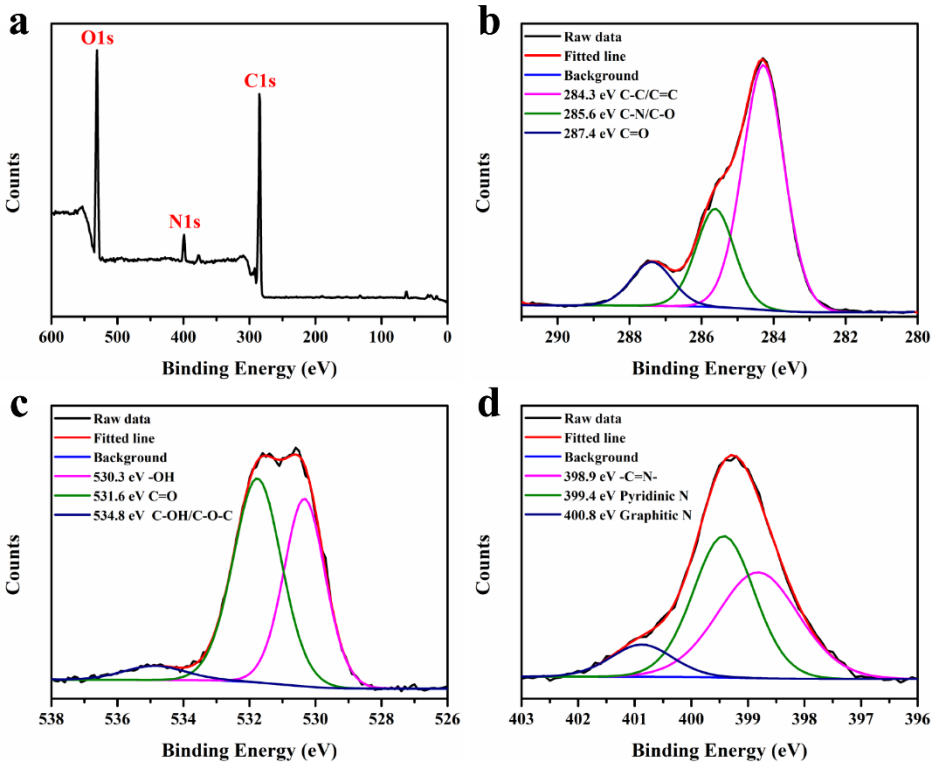

Figure S2. (**a**) Full XPS spectrum of FW-CDs; (**b**) High-resolution C 1s XPS spectrum; (**c**) O 1s XPS spectrum; (**d**) N1s XPS spectrum of FW-CDs.

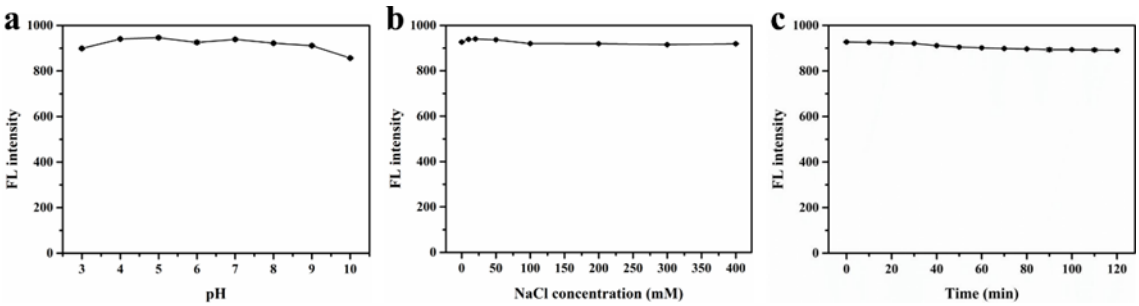

Figure S3. (**a**) The fluorescence intensity of FW-CDs at different pH values; (**b**) Effect of NaCl concentration on the fluorescence intensity of FW-CDs; (**c**) Photostability of FW-CDs irradiated by xenon lamp for different amounts of time. (The error bar was not obvious due to the small fluctuation of data).

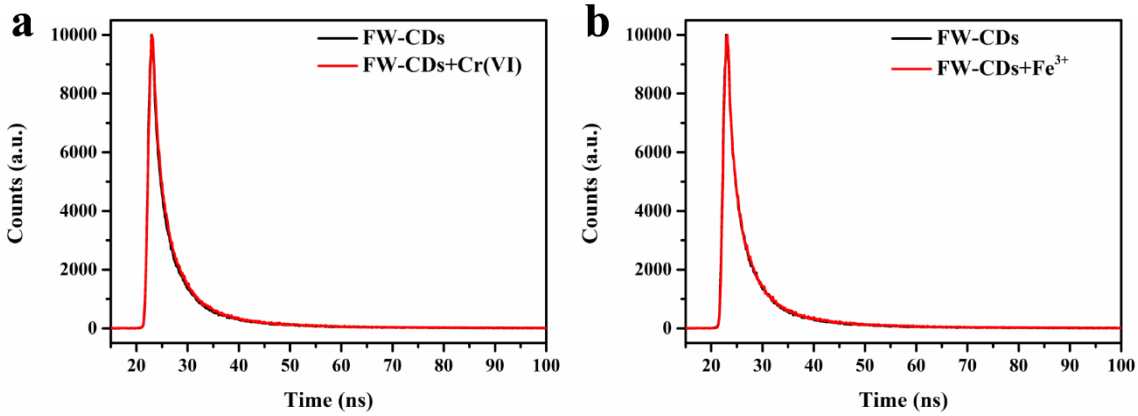

Figure S4. Fluorescence decay curve of as-prepared FW-CDs in the absence and presence of Cr(VI) (**a**) and Fe^{3+} (**b**) with excitation at 375 nm.

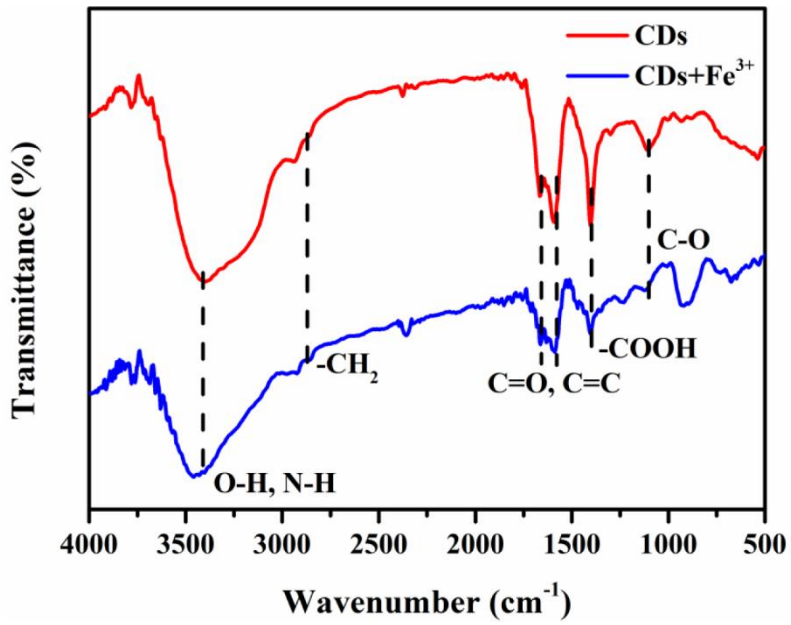

Figure S5. FTIR spectra of the FW-CDs and FW-CDs/Fe^{3+} mixture.

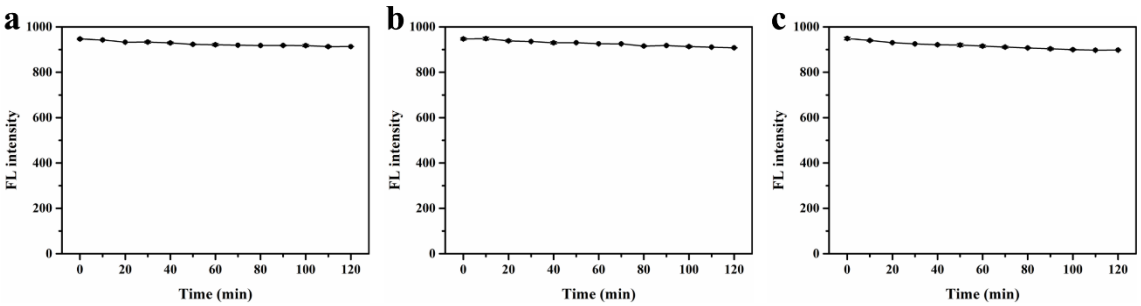

Figure S6. Photostability of FW-CDs irradiated by xenon lamp for different amounts of time in tap (**a**), lake (**b**), river water (**c**). (The error bar was not obvious due to the small fluctuation of data).

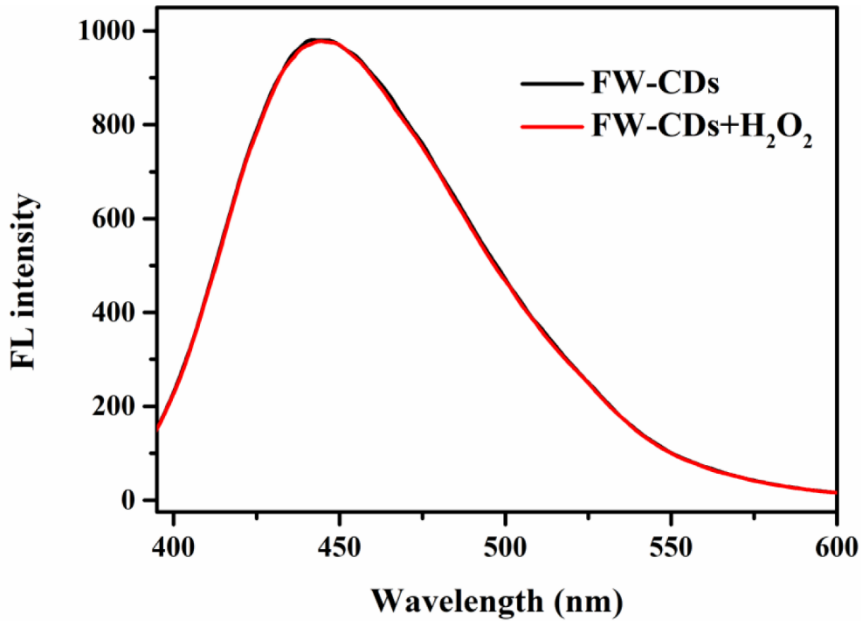

Figure S7. The fluorescence intensity changes of FW-CDs in the absence and presence of 500 μM H_2O_2.

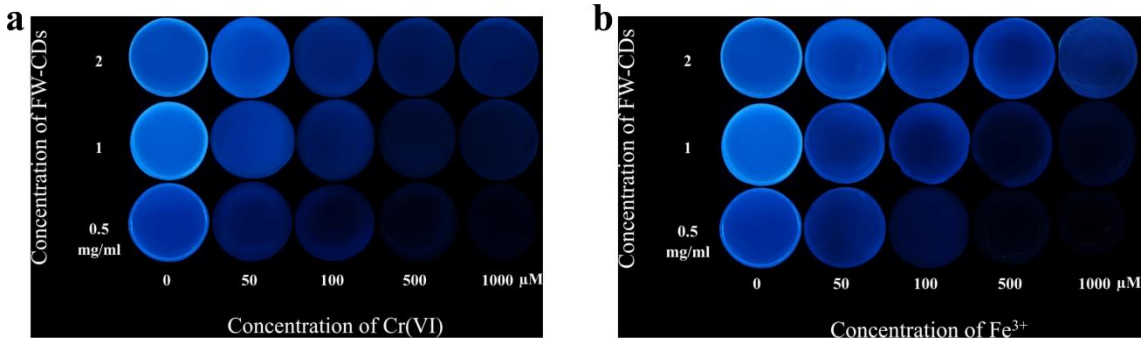

Figure S8. Comparison of the fluorescence intensity of FW-CDs hydrogels containing different concentrations of FW-CDs in the presence of different amounts of Cr(VI) (a) and Fe^{3+} (b).

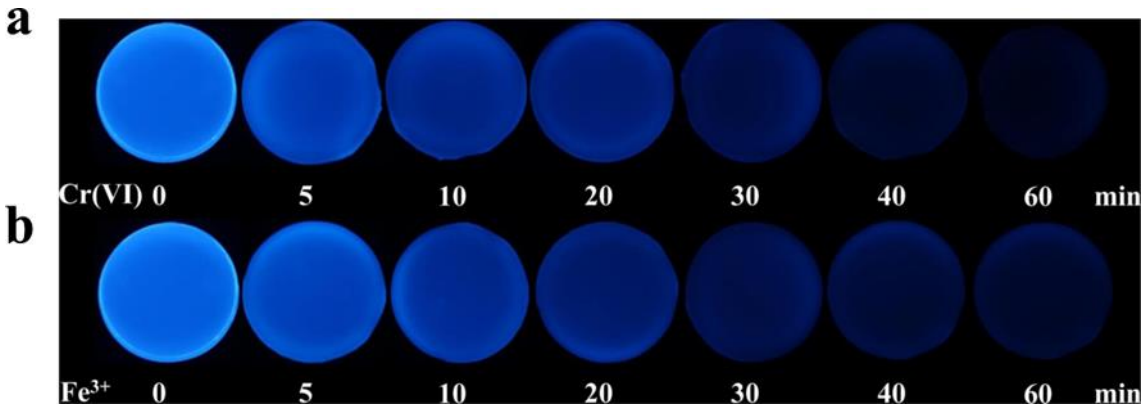

Figure S9. The fluorescence quenching effect of FW-CD hydrogels in 100 μM Cr(VI) (**a**) and Fe^{3+} (**b**) solution at different incubating time.

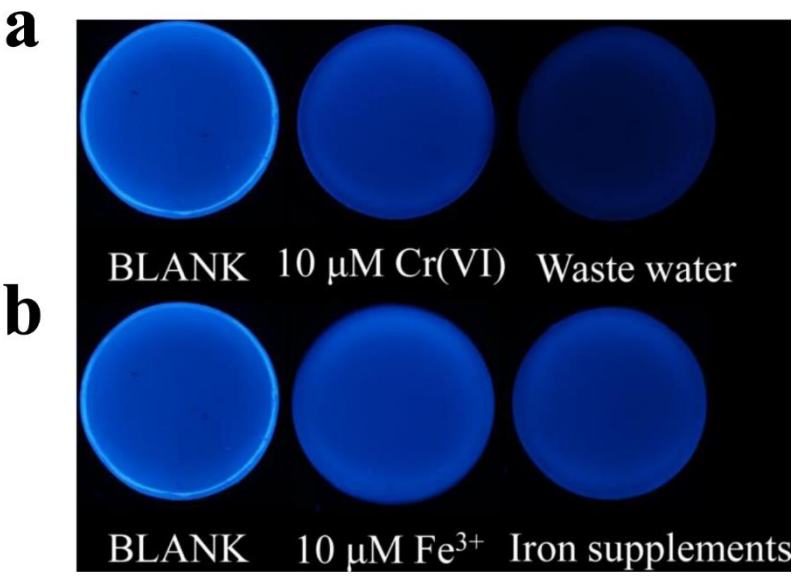

Figure S10. (**a**) Fluorescence comparison between FW-CDs hydrogels, FW-CDs hydrogels incubated with 10 μM Cr(VI), and FW-CDs hydrogels incubated with wastewater, respectively; (**b**) Fluorescence comparison between FW-CDs hydrogels, FW-CDs hydrogels incubated with 10 μM Fe^{3+}, and FW-CDs hydrogels incubated with iron supplement, respectively.