A Facile Synthesis of Label-Free Carbon Dots with Unique Selectivity-Tunable Characteristics for Ferric Ion Detection and Cellular Imaging Application

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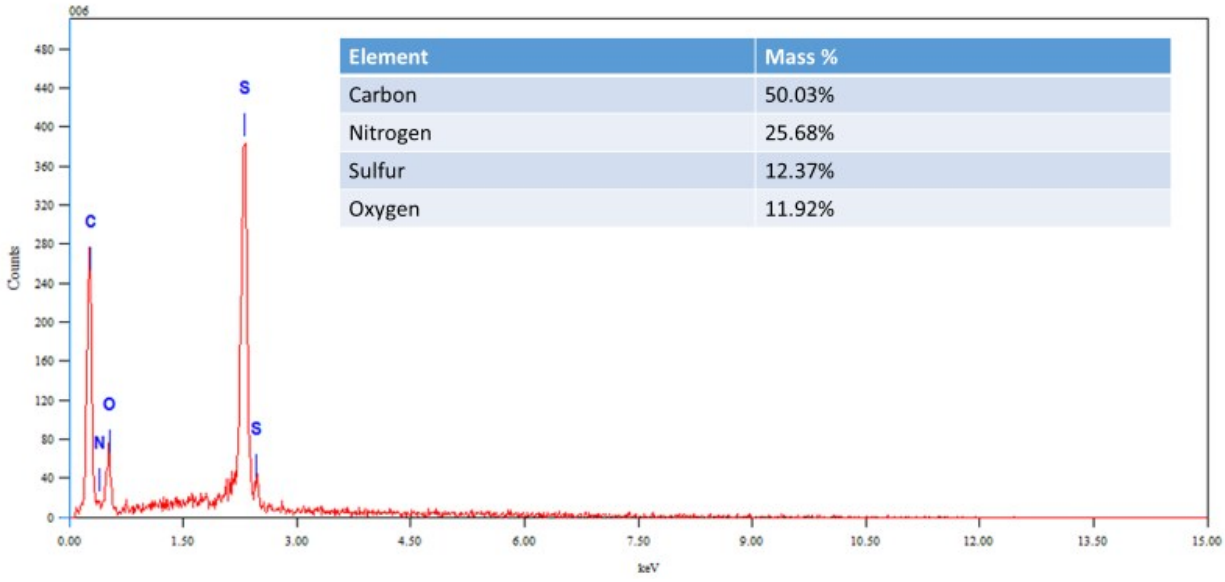
Supplementary Information



Element	Mass %
Carbon	50.03%
Nitrogen	25.68%
Sulfur	12.37%
Oxygen	11.92%

Figure S1: The EDX spectrum of the NS-CDs. Inset shows the content of elements in percentage.

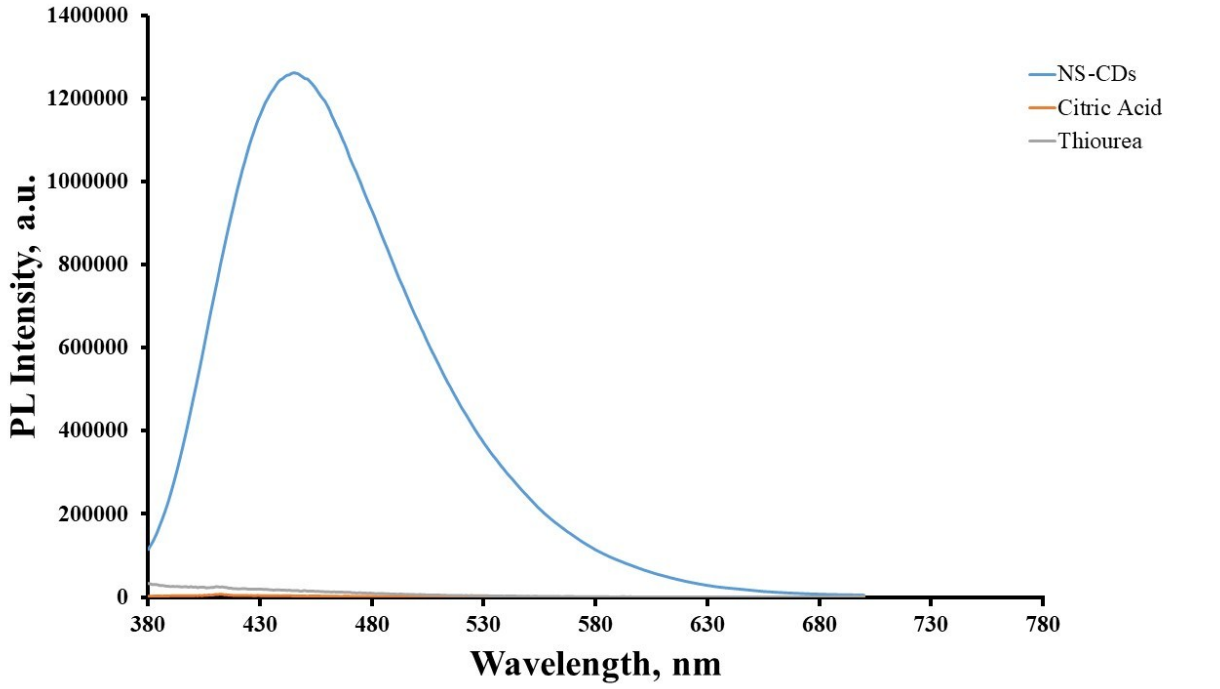


Figure S2: The PL emission of the citric acid and thiourea as compared to NS-CDs at 360nm excitation.

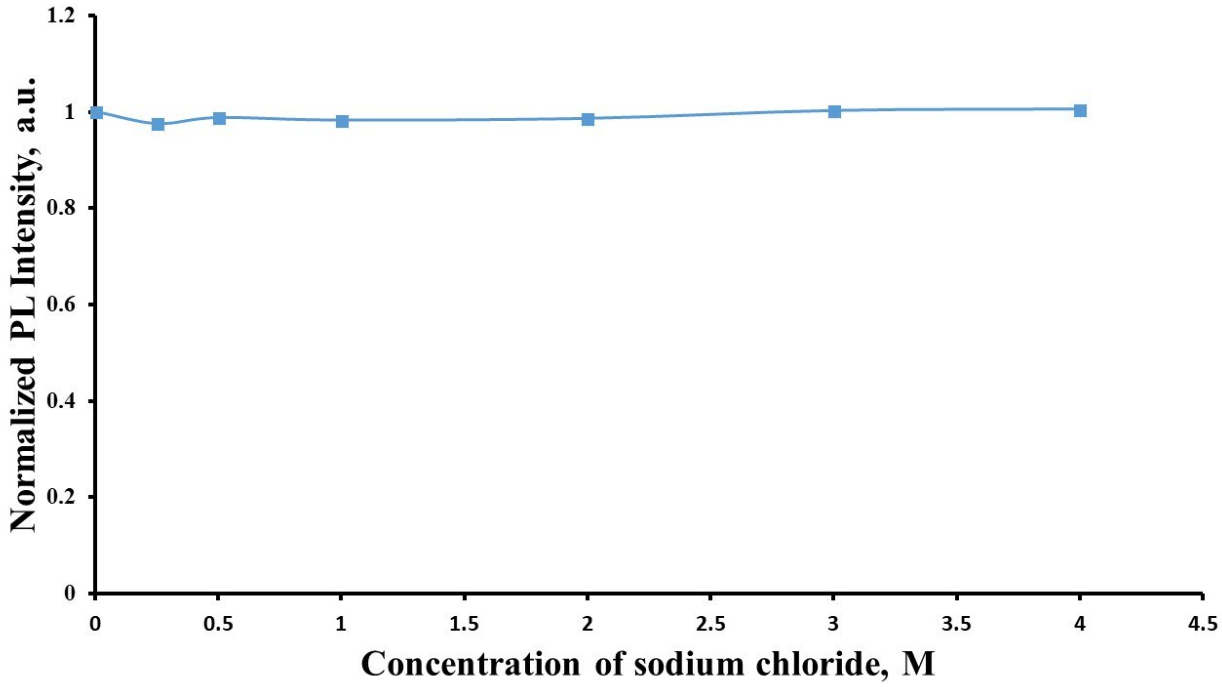


Figure S3: The effect of ionic strength on normalized PL intensity of NS-CDs.

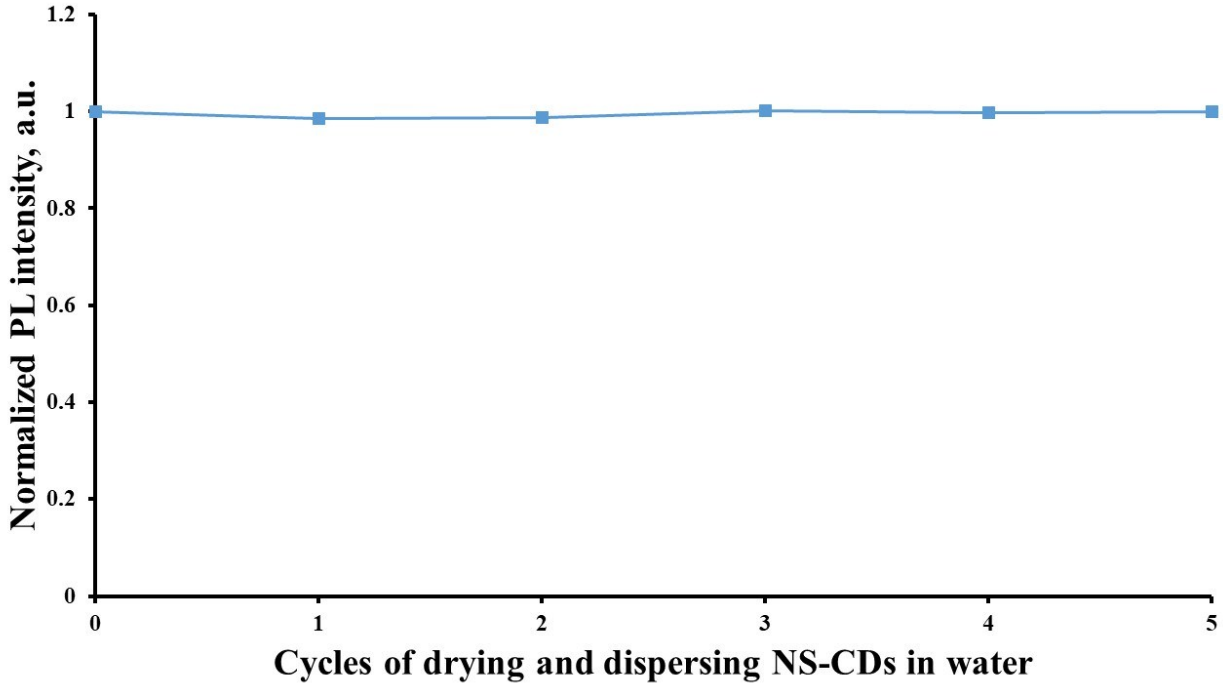


Figure S4: The effect of repetitive drying and dispersing on normalized PL intensity of NS-CDs.

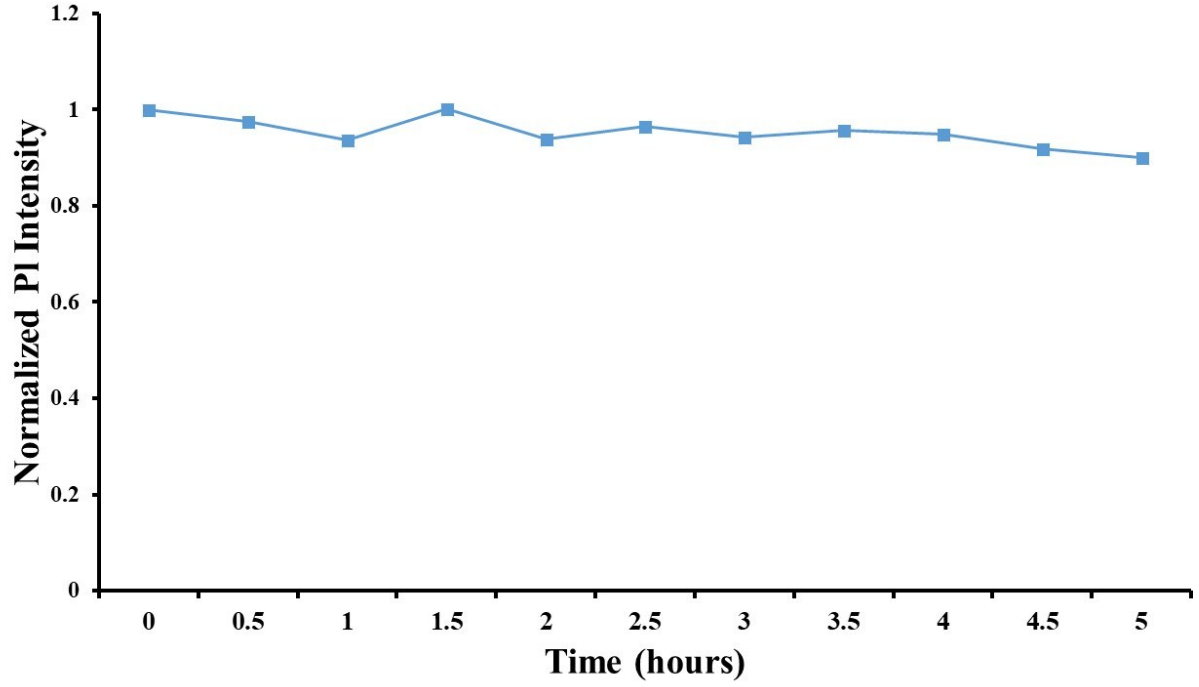


Figure S5: The effect of UV irradiation time on normalized PL intensity of NS-CDs

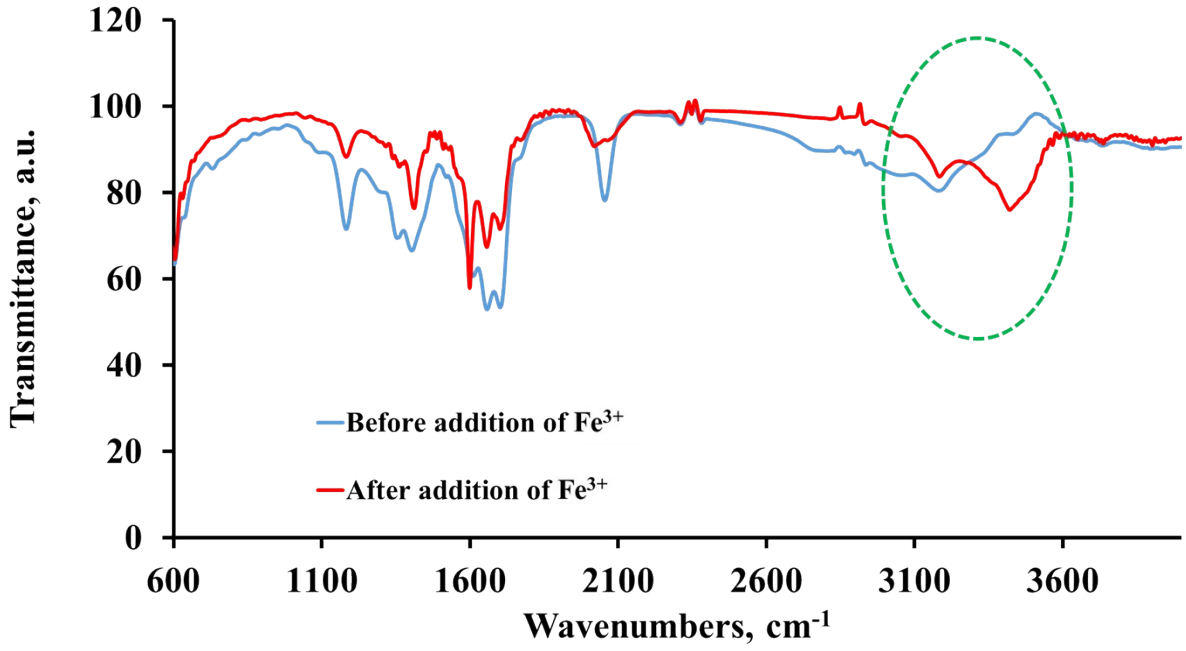


Figure S6: FTIR spectra of NS-CDs before and after the addition of Fe^{3+}.

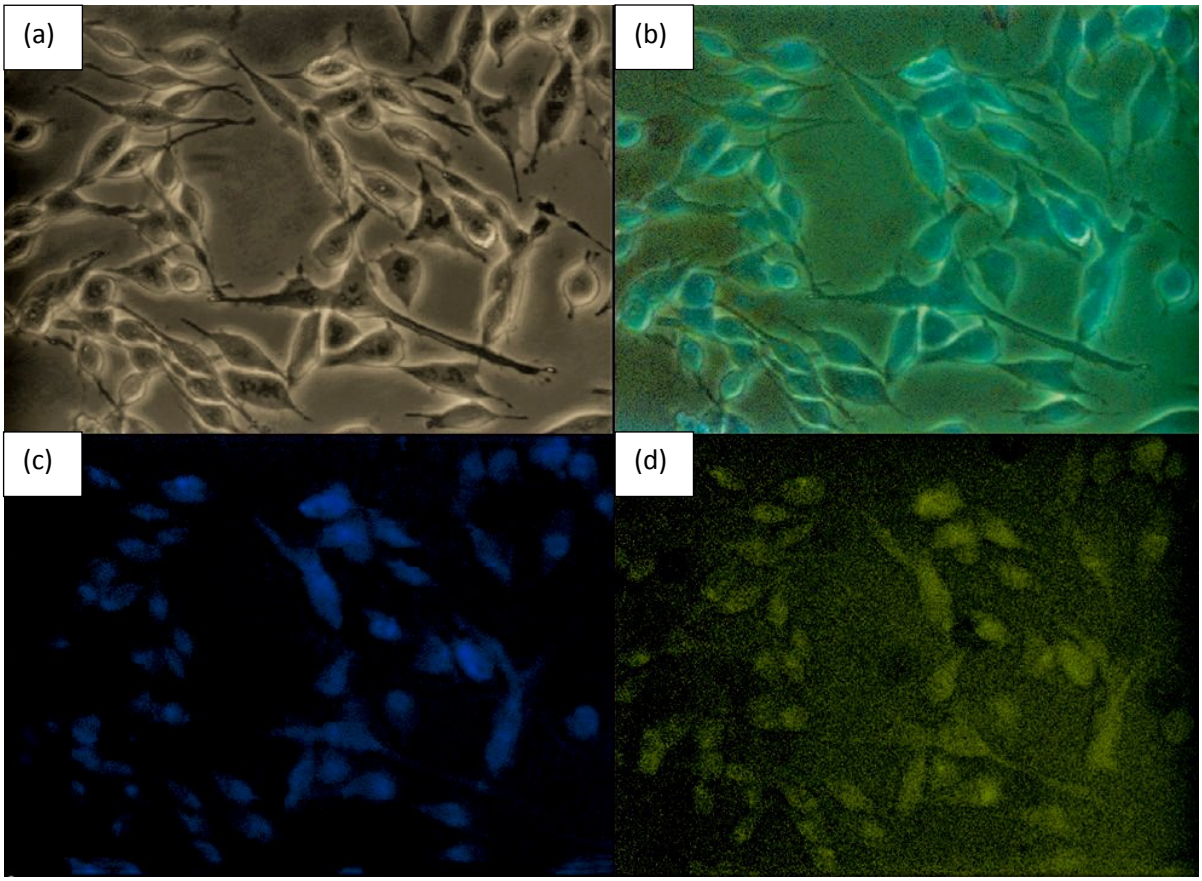


Figure S7: Microscopy images of MiaPaCa-2 pancreatic cancer cells incubated with 0.1mg/ml of NS-CDs for 6 hours. (a) bright field image; (b) merged image (a), (c) and (d); (c) fluorescence image of cancer cells with $\lambda_{ex}/\lambda_{em}$ of 405nm/450nm±50nm; (d) fluorescence image of cancer cells with $\lambda_{ex}/\lambda_{em}$ of 488nm/525nm±50nm.

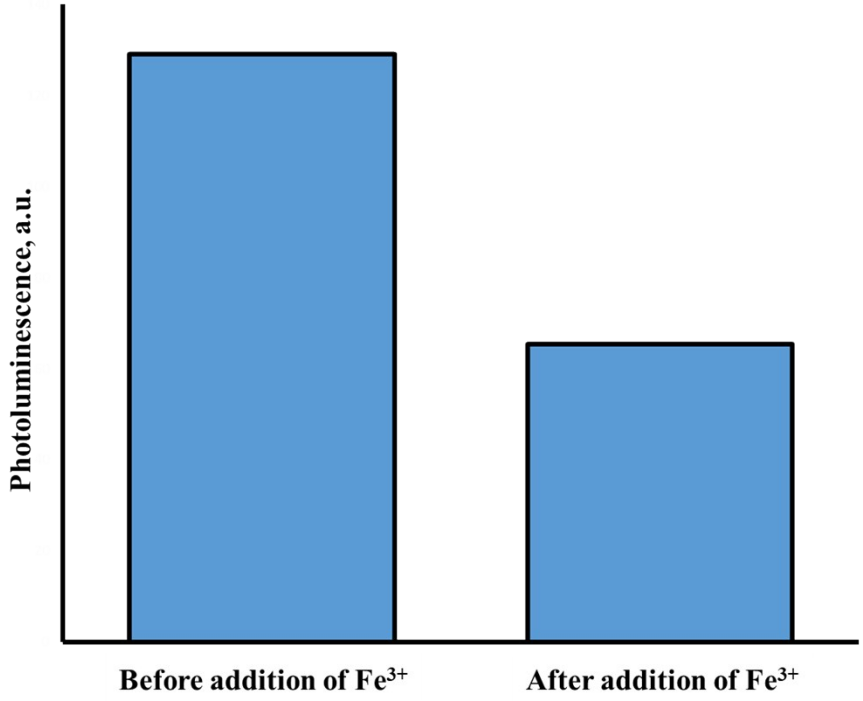


Figure S8: The average fluorescence intensity of the cancer cells before and after addition of Fe^{3+}, analyzed using ImageJ.

Elements	Concentration Unit	Tap Water
Zn	ppb	23.367
Zn	ppm	0.023
Cd	ppb	<1.00
Cd	ppm	<0.001
Ca	ppm	22.804
K	ppm	4.222
Mg	ppm	1.135
Na	ppm	17.124
S	ppm	10.898
Si	ppm	1.727
B	ppb	99.447
Al	ppb	4.493
Mn	ppb	<1.00
Cu	ppb	15.819

Sr	ppb	29.749
Ba	ppb	7.573
Pb	ppb	<1.00
Li	ppb	<1.00
Be	ppb	<1.00
Ti	ppb	<1.00
V	ppb	<1.00
Cr	ppb	<1.00
Fe	ppb	<1.00
Co	ppb	<1.00
Ni	ppb	<1.00
As	ppb	<1.00
Se	ppb	<1.00
Zr	ppb	<1.00
Mo	ppb	<1.00
Ag	ppb	<1.00
Sn	ppb	<1.00
Sb	ppb	<1.00
Hg	ppb	<1.00
Tl	ppb	<1.00

Table S1: Elements in tap water as analyzed using ICPMS. The suffix ppm and ppb denote parts per million and parts per billion respectively.

Sample	Spiked with Fe^{3+}(μM)	Spiked with Zn^{2+}, Cd^{2+}, Mn^{2+}(μM)	Measured Fe^{3+} (μM)	Recovery (%)
1	100	50	98.06	98.06
2	100	100	98.29	98.29
3	100	200	98.19	98.19

Table S2 Recoveries of Fe^{3+} ions in tap water spiked with different concentration of Zn^{2+}, Cd^{2+} and Mn^{2+}.