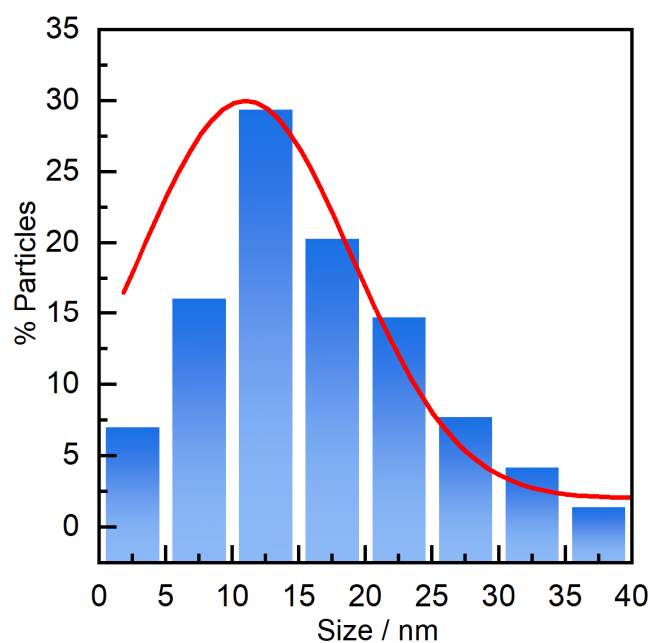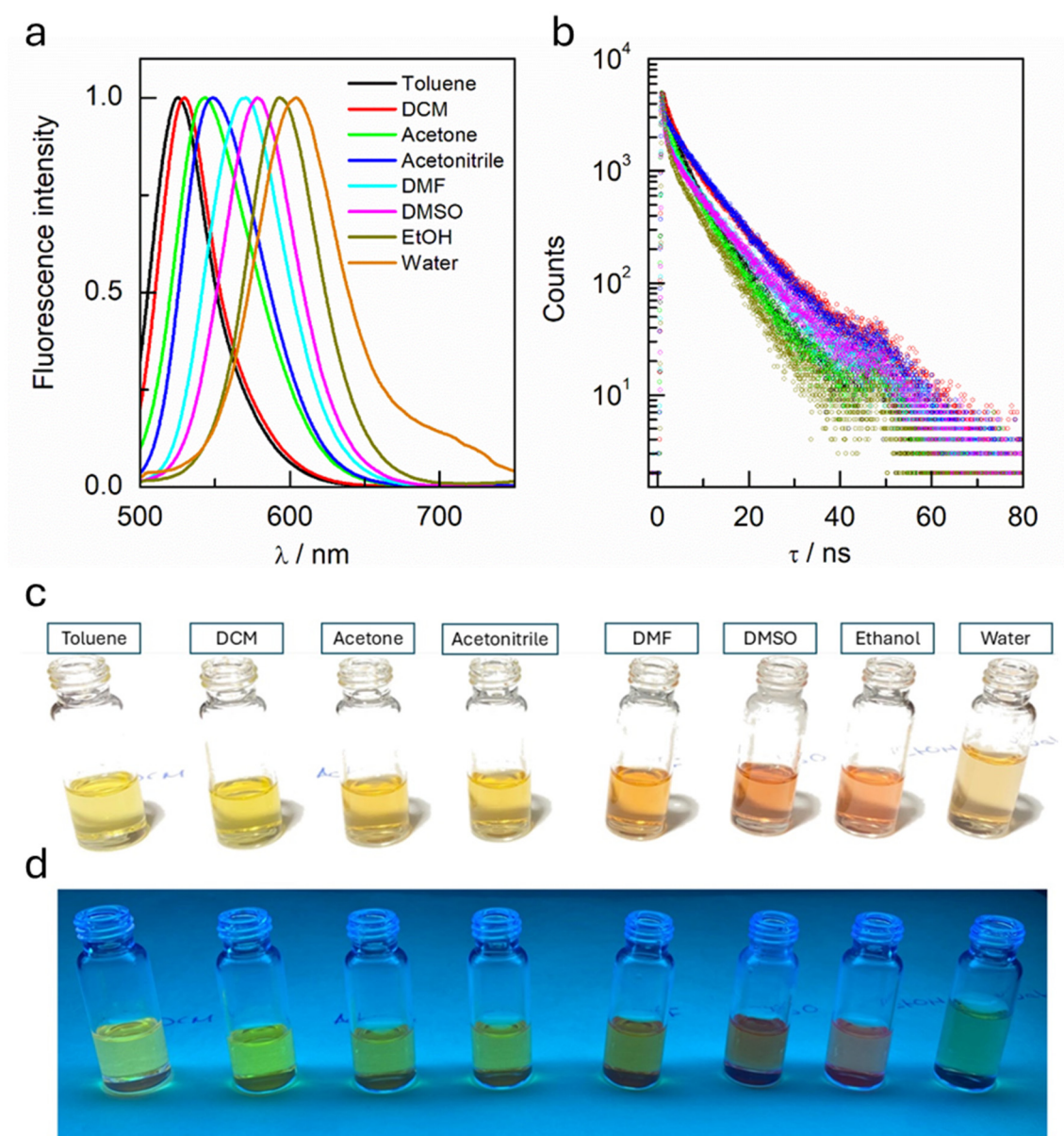# Fluorescent Carbon Nanoparticles with Red Emission: A Selective Sensor for Fe(III) ion Detection


Figure S1. Particle size distribution of rCDs obtained by analyzing TEM images.

Figure S2. Influence of the solvent dielectric constant on the (a) emission band and (b) fluorescence lifetime of rCDs. Corresponding photographs of CDs in different solvents as a function of their polarity under sunlight (C) and UV-visible light (350nm) (d).

Table S1. Influence of the solvent dielectric constant on the emission band and fluorescence lifetime of rCDs.

Solvent	Dielectric constant	Emission wavelength / nm	Lifetime / ns
Toluene	2.38	525	5.12
DCM	8.93	530	7.44
Acetone	20.70	543	5.20
Acetonitrile	37.50	550	7.61
DMF	36.70	570	6.98
DMSO	46.70	580	7.39
Ethanol	24.50	594	4.90
Water	78.00	604	1.43
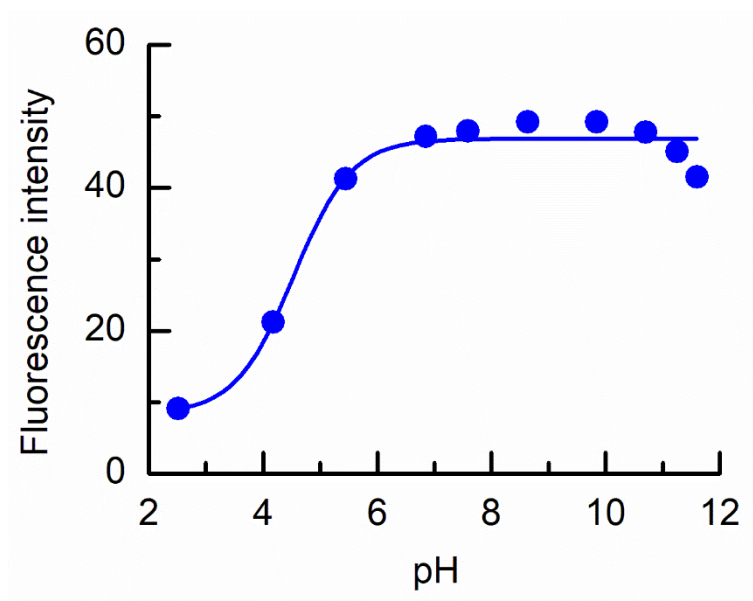
Figure S3. Fluorescence intensity of the rCDs in aqueous solutions at different pHs by excitation at 510nm.
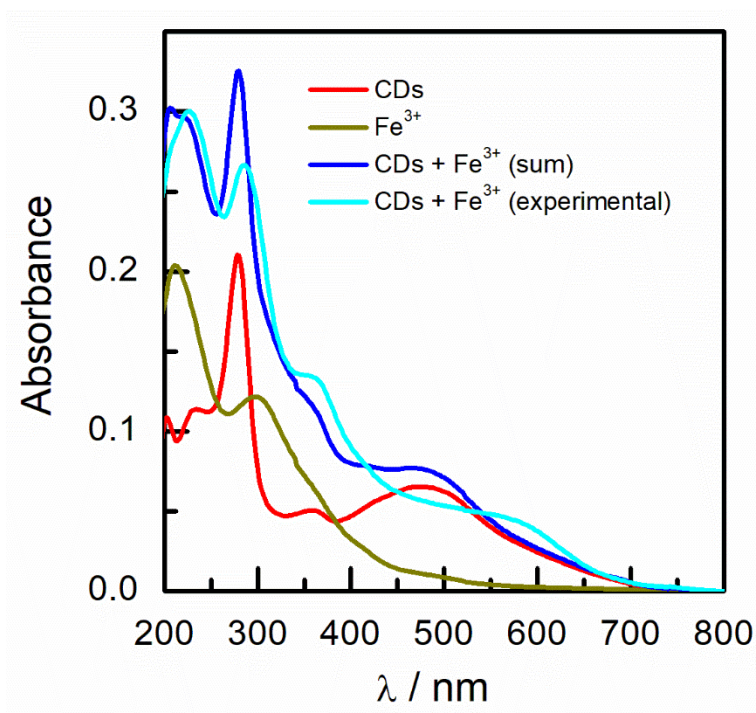
Figure S4. UV-visible spectra of the different components in the final solution of the quenching of rCDs by Fe(III) ions.

Table S2. Comparison of analytical performances of the red CDs for Fe(III) sensing compared to formerly reported Fe(III) sensors.

Type of nanomaterial (Source)	Type of sensor	Wave-length	Linear range	LOD	Ref
CDs (Mint)	Fluores-cence	441 nm	0.5 - 100 µM	0.104 µM	[1]
CDs (Pineapple)	Fluores-cence	438 nm	0.05–500 µM	30 nM	[2]
CDs (o-phenylenediamine and gallic acid)	Fluores-cence	570 nm	0 to 100 µM	0.8 µM	[3]

Passivated/functionalized CDs	Fluorescence	517 nm	0.8–80.0 μM	0.161 μM	[4]
CDs (triphenylamine aldehyde and 2,3-diaminopyridine)	Fluorescence	487 nm	0-130 μM	-	[5]
Boron and nitrogen codoped CDs	Fluorescence	304 nm	0.5–80 μM	0.1 μM	[6]
N-doped red emission CDs	Fluorescence	600 nm	5-120 μM	0.034 μM	[7]
N-CQDs	Fluorescence	560 nm	0 to 180 μM	55.7 μ mM	[8]
CDs (chitin)	Fluorescence	360 nm	40–600 μM	0.43 μM	[9]
Red CDs	Fluorescence	600 nm	0-50 μM	0.85 μM	this work

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