One-pot synthesis of graphene quantum dot and simultaneous nanostructured self-assembly via a novel microwave-assisted method: Impact on triazines removal and efficiency monitoring

Supporting Information

*FIGURES:

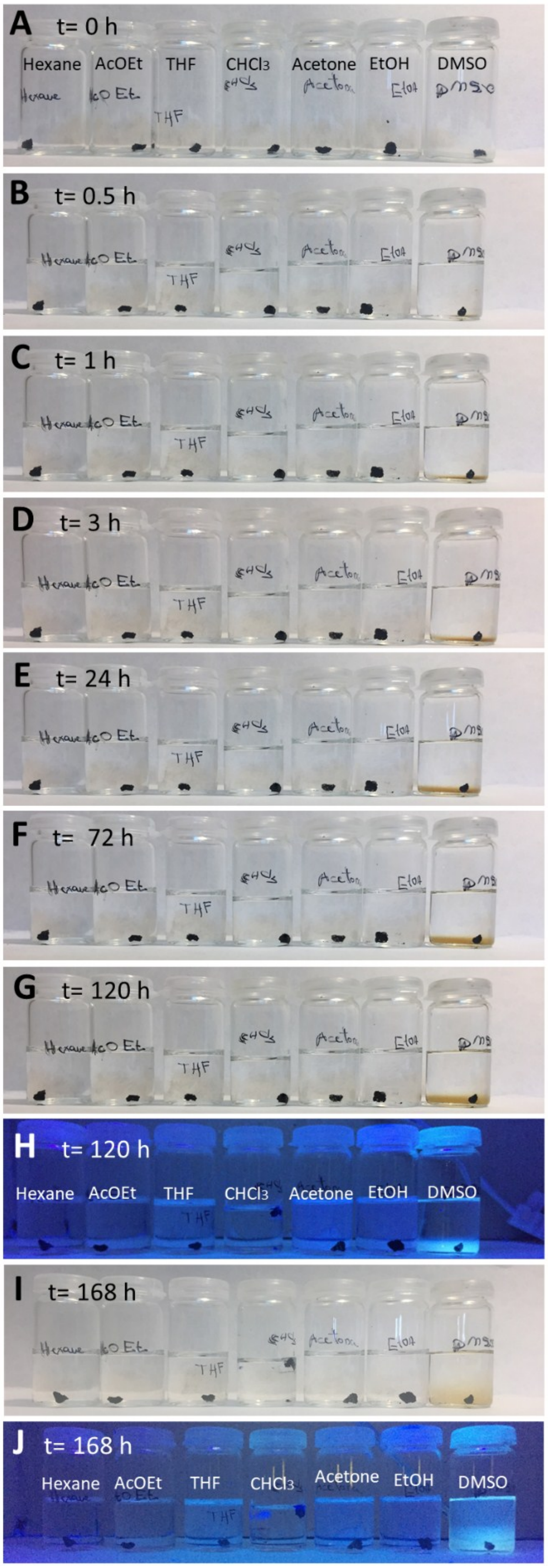


Figure S1. Photographs of the GQD-assemblies in presence of organic solvents under sunlight (*A-G, I*) and UV light (*H, J*) at different periods of time after manual stirring. Non polar solvents like hexane and chloroform ($CHCl_3$), variable polarity aprotic solvents like ethyl acetate (AcOEt), tetrahydrofurane (THF), acetone and dimethyl sulfoxide (DMSO) and polar protic solvents like ethanol (EtOH) were selected.

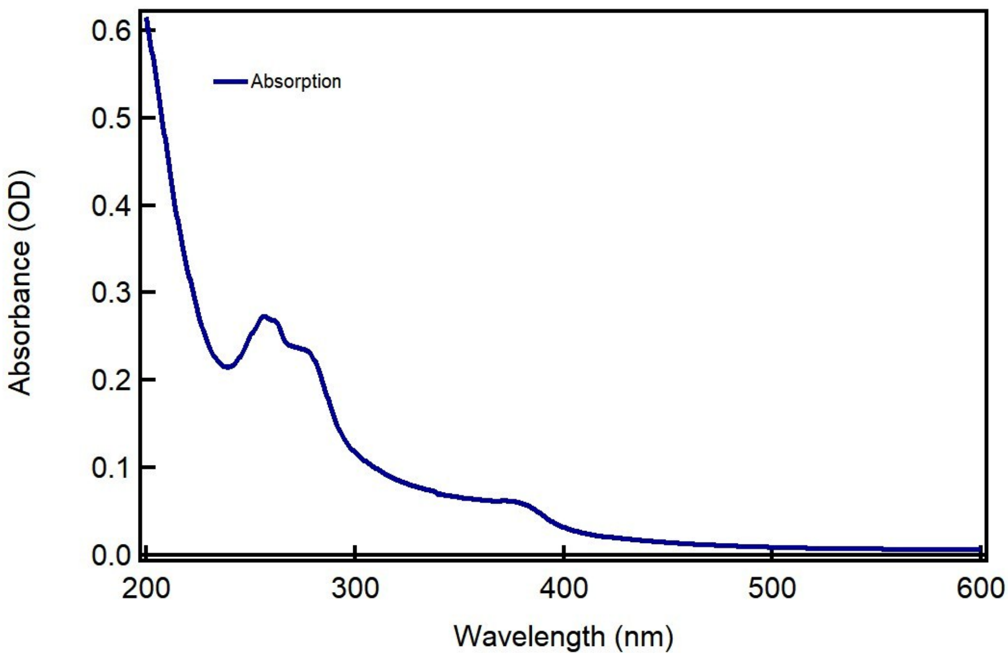


Figure S2. Absorption spectra of GQDs in aqueous solution (at 1.32 mg/mL) recorded in a 1 cm cuvette.

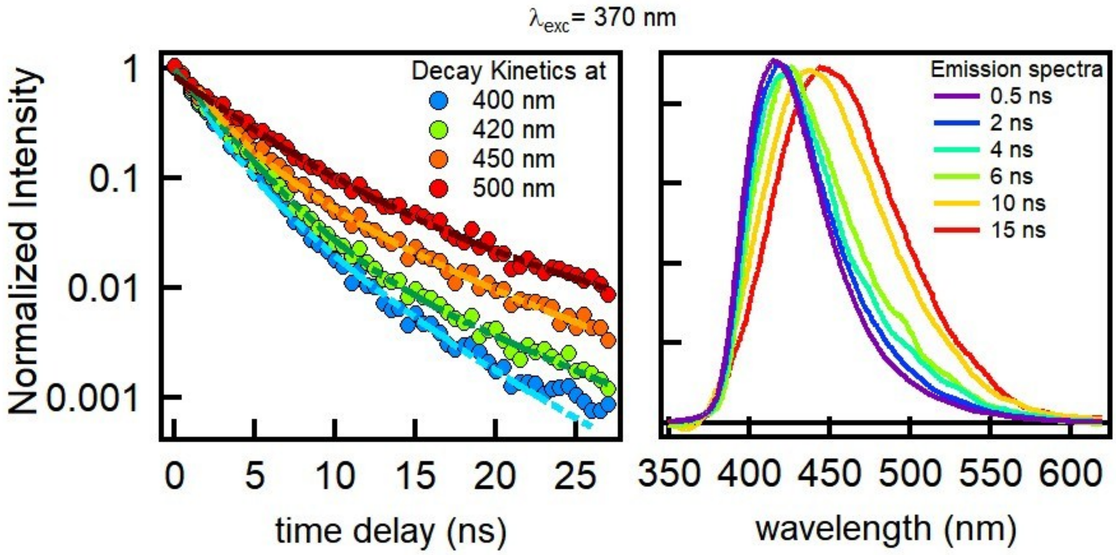


Figure S3. Left panel: decay kinetics at different emission wavelengths (indicated in the legend) excited at 370 nm, with the best-fitted curves. Right panel: emission spectra at different delay times from the peak of the laser (indicated in the legend).

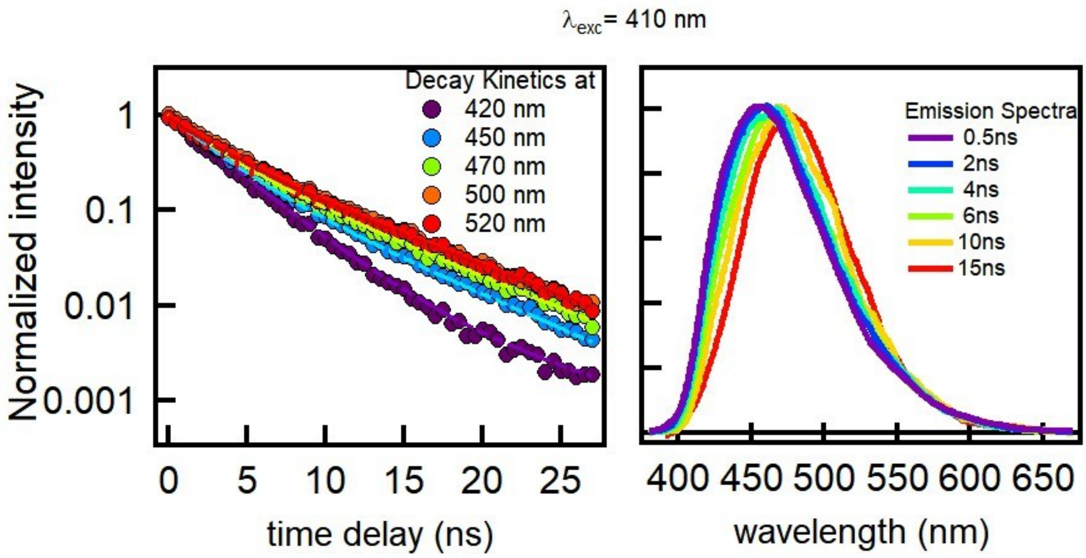


Figure S4. Left panel: decay kinetics at different emission wavelengths (indicated in the legend) excited at 410 nm, with the best-fitted curves. Right panel: emission spectra at different delay times from the peak of the laser (indicated in the legend).

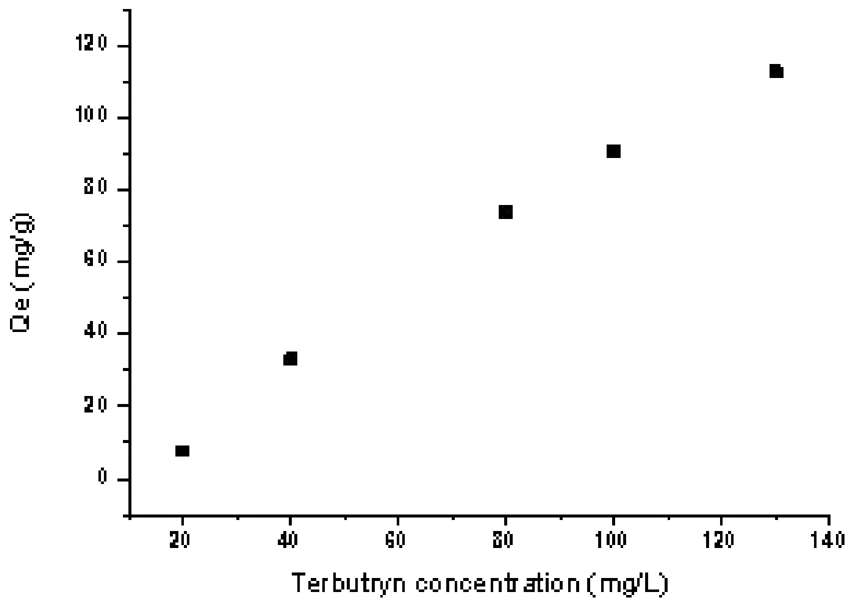
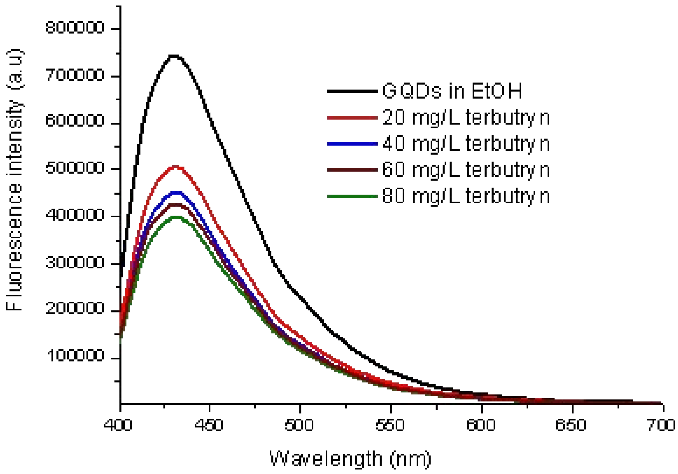
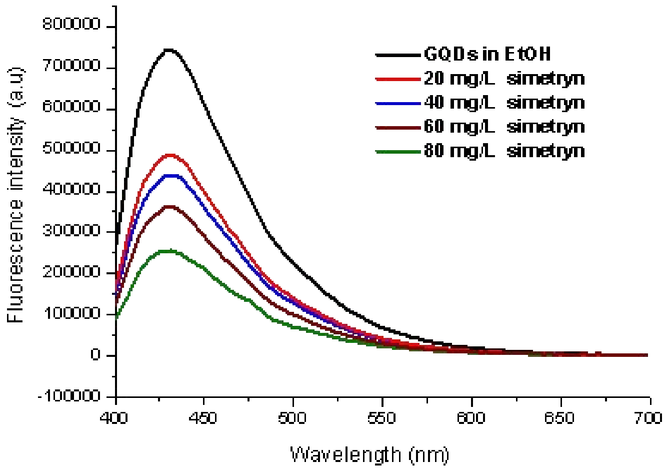


Figure S5. Adsorption histeresis displayed by the aerogel in response to different concentration of terbutryn (1-150 mg/L), calculated by gas chromatography-mass spectrometry. *Qe* is the concentration of the adsorbed solute.

A



B



C

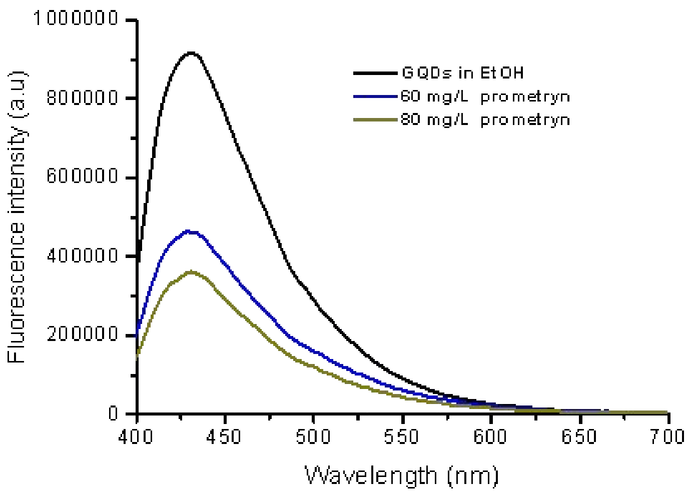


Figure S6. Fluorescence behavior of GQD in absence and presence of terbutryn, simetryn and prometryn at different concentrations (0-80 mg/L) in ethanol.

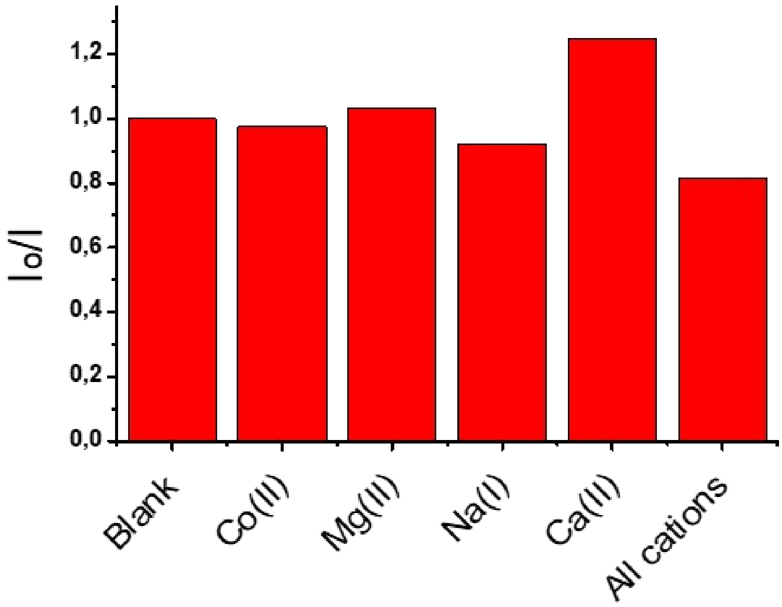


Figure S7. Quenching of the fluorescence of GQDs in solution in presence of diverse cations at concentrations of 10 μg/mL.

*TABLES:

Table S1. Microwave synthetic conditions used for preparing GQDs.

Sample	Microwave conditions				
	T_1 /ºC	T_2/ºC	Time of reaction	ratio urea/glucose	Aerogel formation
1	140	80	10	69:1	no
2	160	90	10	69:1	no
3	150	85	10	69:1	no
4	140	80	20	69:1	no
5	140	80	20	6:1	yes

Table S2. Main characteristic and roles of carbon-based materials obtained from similar precursors.

Precursors	**Synthetic conditions**	**Use of acid**	**Carbon nanoparticle formed**	**Quantum Yield**	**Porosity**	**Roles**	**Ref.**
1) Glucose 2) Urea	3 steps: 1) Hydrothermal process of glucose in autoclave. 2)Urea modification. 3)KOH activation	-	Carbon nanosphere	-	Micropores	**SORBENT** of CO_2	*1*
Glucose	Hydrothermal reaction in microwave	-	GQD	7-11%	-	**LIGHT CONVERTER**	*2*
Glucose and urea	Microwave oven	-	N-GQD	5.2%	-	As promising **LABELLING**	*3*
Glucose and urea	Microwave reaction	HBO_3	GQD boron nitride BCNO phosphor	27-31%	-	In light emitting diodes (**LED**)	*4*
Glucose and urea	Microwave reaction		CDs	0.7-1 %	-	**PHOTOCATALYST**	*5*
Glucose and urea	One-step annealing at 900 °C	H_3PO_4	N,P doped nanoporous graphene	-	Nanopores	**CATALYST** in hydrogen evolution reaction	*6*
Glucose and urea	Hydrothermal reaction in microwave	H_3PO_4	GQD-assemblies	11-32%	Macropores	**SORBEN**T and **SESNSOR** of triazine	*This work*

Table S3. Fit parameters of the decay kinetic curves excited at 370 nm in Figure S2 and the estimated value of the average lifetime.

λ_{em}	τ_1 (ns)	A1	τ_2 (ns)	A2	τ_m (ns)
400 nm	2.1	74000	6.3	3000	2.6
420 nm	2.4	94000	7.3	5000	3.1
450 nm	2.6	48000	7.7	6700	4.1
500 nm	3.9	9000	11.1	1200	5.9

Table S4. Fit parameters of the decay kinetic curves excited at 410 nm in Figure S3 and the estimated value of the average lifetime.

λ_{em}	τ_1 (ns)	A1	τ_2 (ns)	A2	τ_m (ns)
420 nm	3.3	25000	9.5	700	3.8
450 nm	2.7	31000	6.2	15600	4.6
470 nm	2.6	25000	6.5	19000	5.2
500 nm	3.2	14000	7.0	12000	5.7
520 nm	2.9	9000	7.0	8600	5.8

References

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