

Facile preparation and the stepwise formation mechanistic
investigation of gram-scale nitrogen-doped graphene quantum
dots

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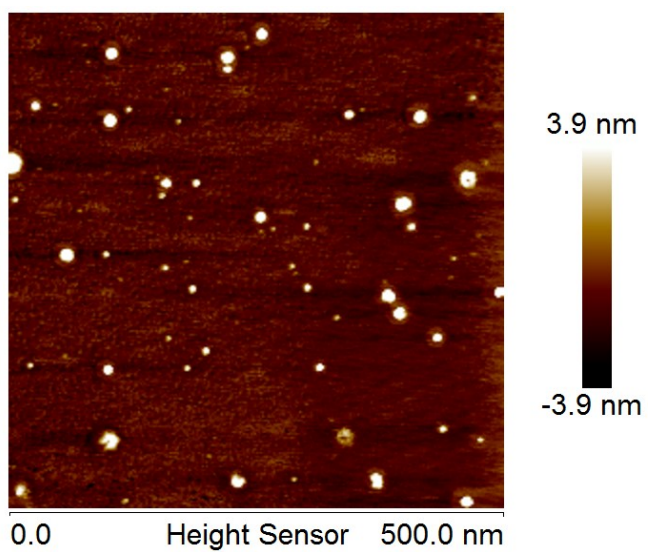


Fig. S1 AFM image of N-doped GQDs with reaction time for 1.5h.

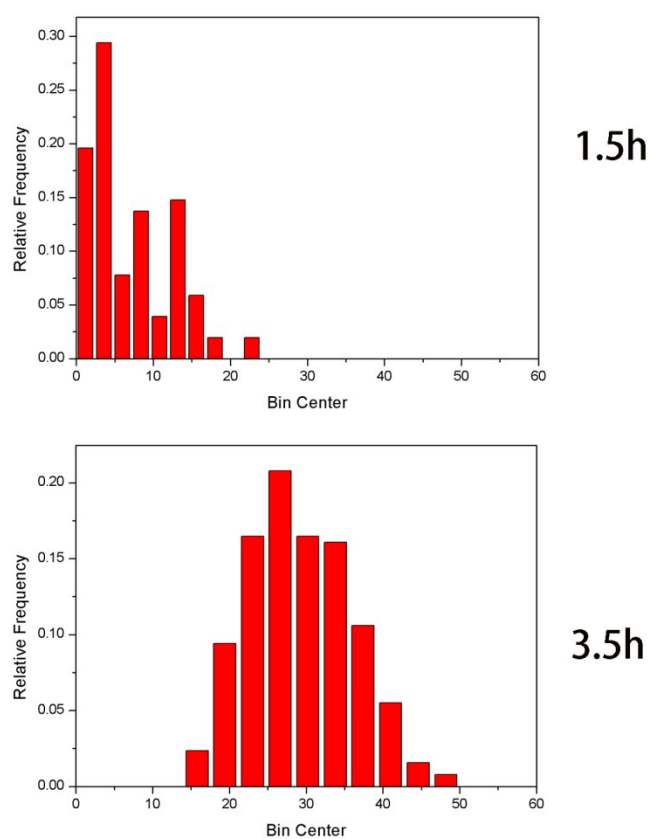


Fig. S2 comparison of size distribution between N-doped GQDs reacted for 1.5h and 3.5h.

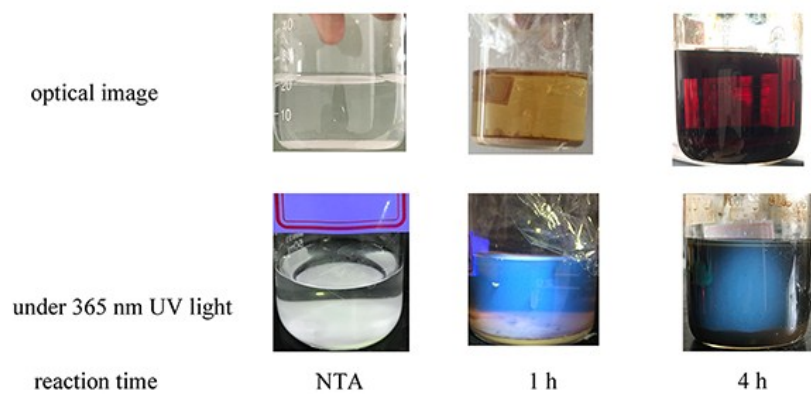


Fig S3. Images after different reaction time in daylight and 365 nm UV light. Label paper on the beaker was used to show the existing of UV light because it contained fluorescent substance.

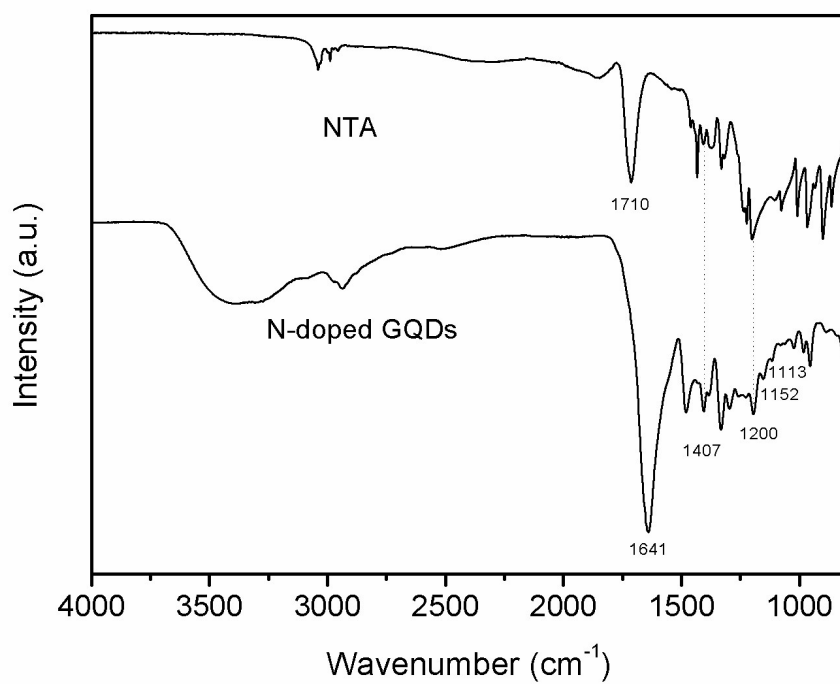


Fig. S4 FT-IR spectra of NTA and N-doped GQDs

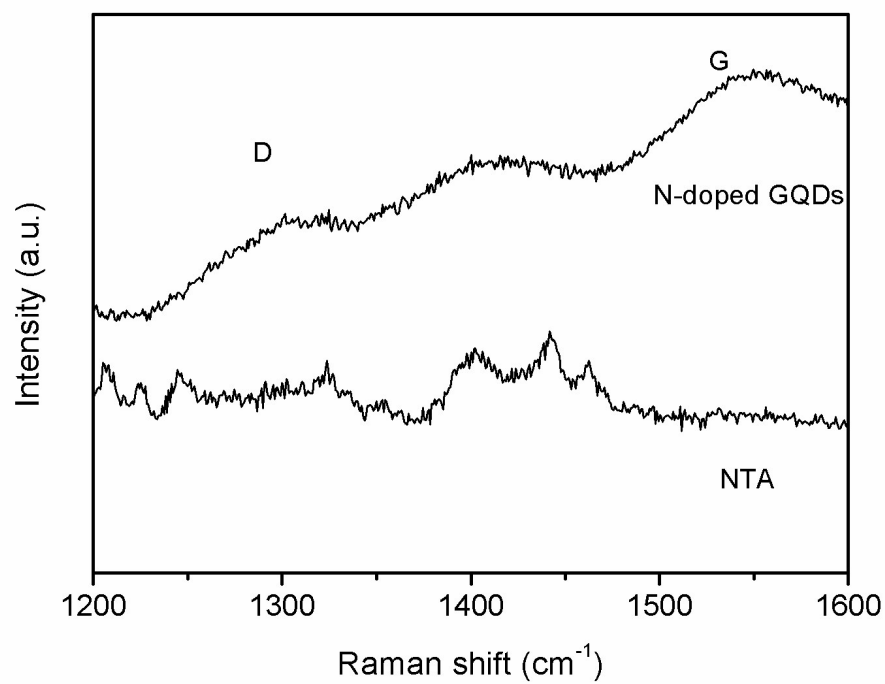


Fig. S5 Raman spectra of NTA and N-doped GQDs

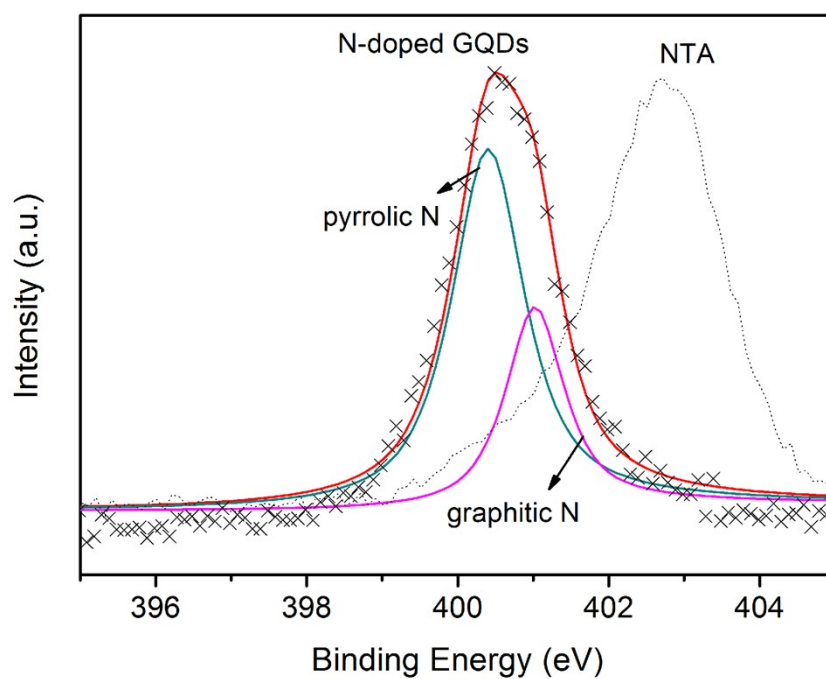


Fig. S6 High resolution XPS spectra of N 1s for N-doped GQDs and NTA.

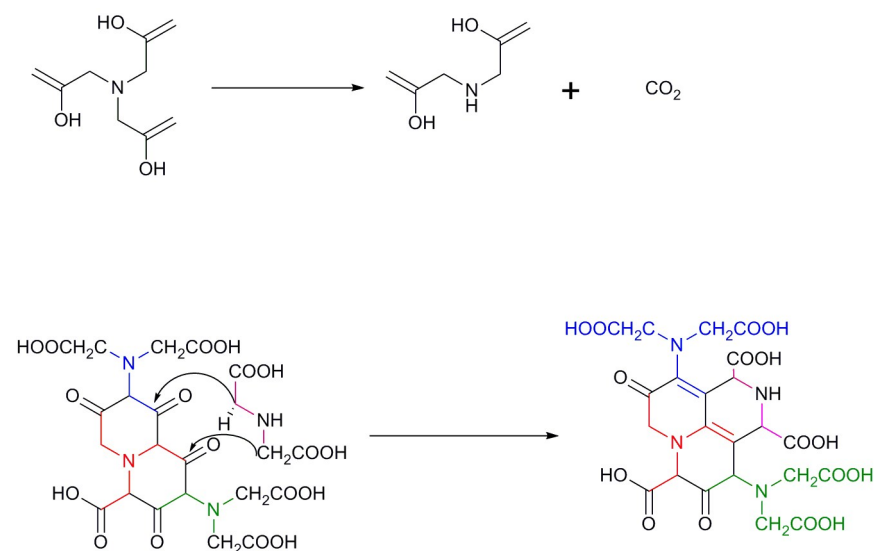


Fig. S7 The formation mechanism of pyrrolic N, which introduce defect to N-doped GQDs plane.

Table S1 Quantum yields (QYs)

Sample	Integrated emission intensity (F)	Absorption (A)	Refractive index of solvent (G)	Quantum yields (Y%)
Quinine sulfate	440137870	0.04418	1.33	57.7
GQDs	575830365	0.072702	1.33	45.8

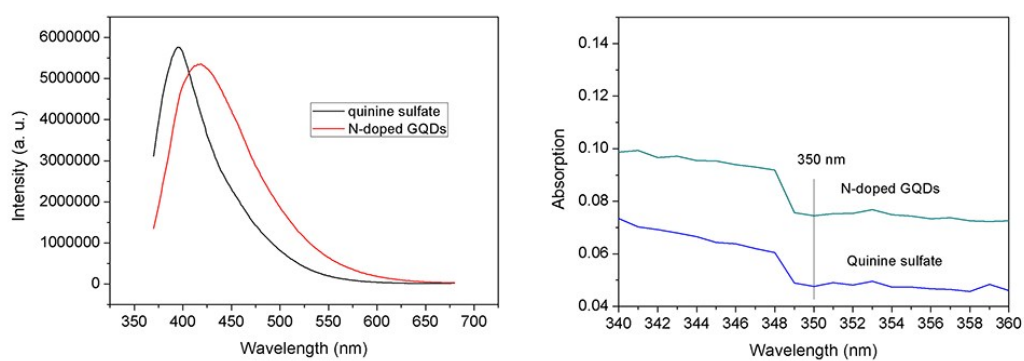


Fig. S8 FL spectrum and UV-vis spectrum of N-doped GQDs and quinine sulfate for quantum yield measurement.

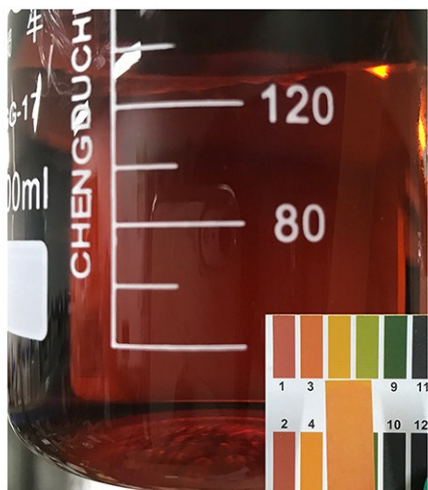


Fig. S9 The pH measure of saturated aqueous solution of N-doped GQDs.

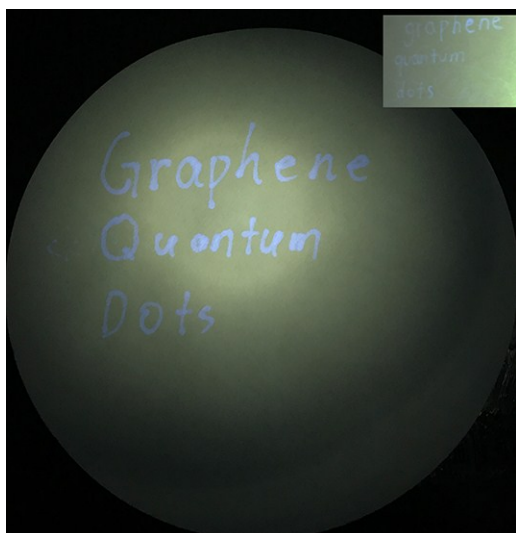


Fig. S10 Image of aqueous FL ink after 24 h of heat treatment at 100 °C. Inset was oil-like FL ink in the same condition.

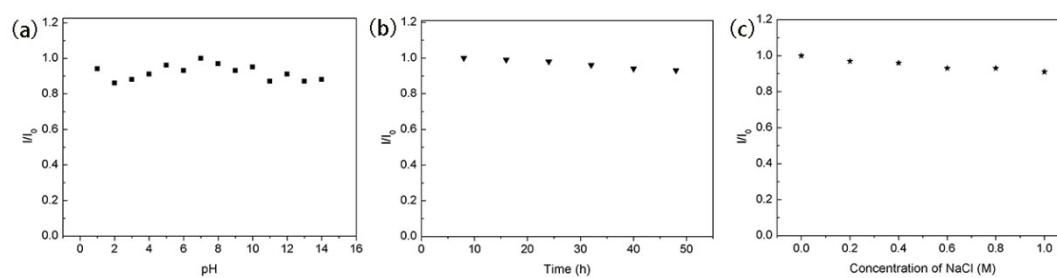


Fig. S11 FL intensity of N-doped GQDs at diverse pH (a), different irradiation time at

365 nm UV light (b) and different concentration of sodium chloride (c).