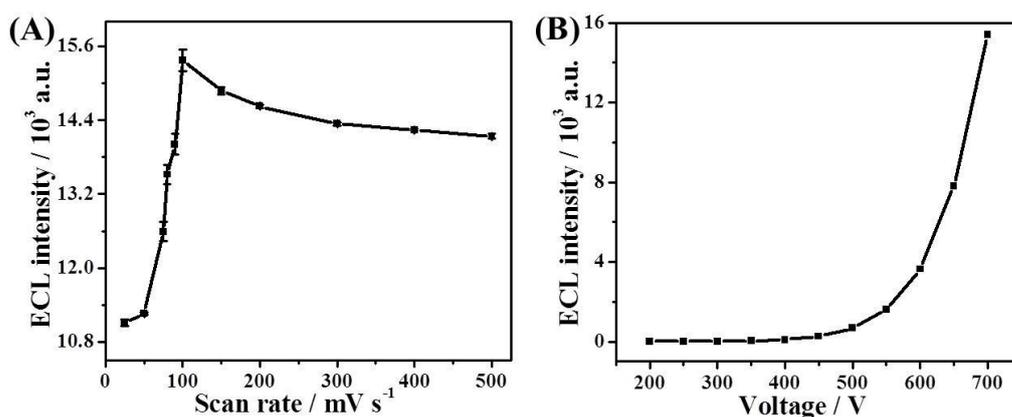


11

12 **Fig. S1.** (A) XPS survey spectrum of the as-prepared NGQDs; (B-D) high-resolution
 13 survey spectra of C_{1s}, N_{1s} and O_{1s} of NGQDs.

14 XPS measurements were further carried out to inspect the chemical composition of
 15 the as-synthesized NGQDs. Fig. S1A illustrates three apparent peaks at 284.6, 401.4
 16 and 532.2 eV, corresponding to the C_{1s}, N_{1s} and O_{1s}, respectively. Fig. S1B shows the
 17 expanded XPS spectrum of the C_{1s} peaks at 284.3, 285, 285.7, 286.6 and 288.6 eV,
 18 which are associated with C=C, C-N, C-O, C=O and O-C=O bonds, respectively.^{1,2}
 19 N_{1s} spectrum (Fig. S1C) of NGQDs can be divided into three components located at
 20 399.5, 400.3 and 401.5 eV, which are assigned to C-N-C, N(C)₃ and N-H,
 21 respectively.³ The O_{1s} core level spectrum (Fig. S1D) can be deduced at 532.2 and
 22 533.3 eV, corresponding to C=O and C-O-C/C-OH bonds. Comprehensively, XPS

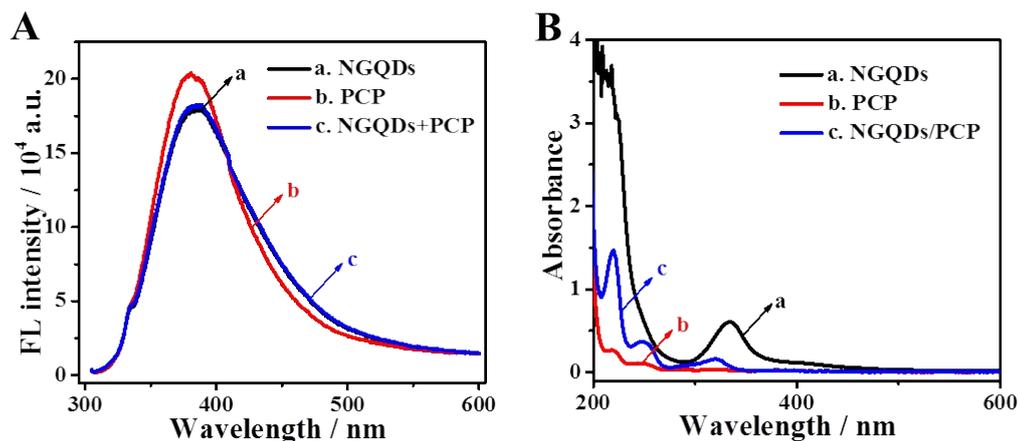
23 observations agree well with FT-IR results, which further demonstrate that various
24 oxygen-containing functional groups distribute on the surface of NGQDs, leading to
25 excellent solubility of NGQDs in water.



26

27 **Fig. S2.** Optimization of experimental parameters: (A) scan rate and (B) applied
28 voltage.

29 Finally, Fig. S2A shows influence of scan rate from 25 to 500 mV s^{-1} on I_{ECL} . The
30 ECL intensity increases sharply and reaches the highest value at the scan rate of 100
31 mV s^{-1} , and then decreases when the scanning rate exceeding 100 mV s^{-1} . So the
32 optimum scan rate is chosen as 100 mV s^{-1} . The effect of voltage applied on I_{ECL} (Fig.
33 S2B) suggests that the larger voltage, the higher ECL signal. However, when the high
34 voltage exceeds 700 V, the phenomenon occurs beyond the maximum range. Finally,
35 700 V is ultimately applied.



36

37 **Fig. S3.** (A) FL and (B) UV-Vis absorption spectra of NGQDs (a), PCP (b) and their
 38 mixture (c).

39 In order to confirm that there is no interaction between NGQDs and PCP, FL and
 40 UV-Vis spectroscopy are conducted. The FL spectra (Fig. S3A) exhibit that the
 41 emission of individual NGQDs features at 392 nm (line a), and the emission
 42 wavelength of alone PCP is located at 380 nm (line b). It can be seen from line c that
 43 the emission wavelength of the mixture of NGQDs and PCP is 385 nm, from which
 44 the interaction between NGQDs and PCP is very difficult to judge. Thus, UV-Vis
 45 properties of NGQDs, PCP and their mixture were investigated.

46 As can be seen from Fig. S3B, NGQDs display one characteristic band at 334 nm
 47 (line a), while individual PCP (line b) exhibits two adsorption peaks at 218 and 251
 48 nm, which are ascribed to the E-bands and B-bands, respectively.⁴ While for their
 49 mixture system (line c), the adsorption bands are exactly the merging of their
 50 individuals, demonstrating no interaction occurs directly between NGQDs and PCP.

51

Table S152 **Table S1.** Recovery studies of PCP in tap and river water samples (n=5).

Sample	Added (pg mL⁻¹)	Found (pg mL⁻¹)	Recovery (%)	RSD (%) (n=5)
River water	0	11.22 ± 0.21	—	1.92
	5	16.66 ± 0.49	102.7	4.57
	10	20.42 ± 0.57	96.2	5.39
	20	30.90 ± 0.48	99.0	4.56
Tap water	0	Not detected	—	—
	5	5.13 ± 0.15	102.6	1.35
	10	9.77 ± 0.37	97.7	3.38
	20	20.42 ± 0.11	102.1	1.04

53

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