Supporting Information for Common Origin of Green Luminescence in Carbon Nanodots and Graphene Quantum Dots

Lei Wang,[†] Shou-Jun Zhu,[‡] Hai-Yu Wang,*[,†] Song-Nan Qu,[§] Yong-Lai Zhang,[†] Jun-Hu Zhang,[‡] Qi-Dai Chen,[†] Huai-Liang Xu,[†] Wei Han,[⊥] Bai Yang*[,‡] and Hong-Bo Sun*[,†,⊥]

[†]*State Key Laboratory on Integrated Optoelectronics, College of Electronic Science and Engineering,* [‡]*State Key Laboratory of Supramolecular Structure and Materials, College of Chemistry,* [⊥]*College of Physics, Jilin University, 2699 Qianjin Street, Changchun 130012, China, and* [§]*State Key Laboratory of Luminescence and Applications, Changchun Institute of Optics, Fine Mechanics and Physics, Chinese Academy of Sciences, Changchun 130033, China*

Corresponding authors: hbsun@jlu.edu.cn, haiyu_wang@jlu.edu.cn, byangchem@jlu.edu.cn

PL QY of samples

The QY was determined by slope method by the reference of 9,10-bis (phenylethynyl) anthracene in cyclohexane (QY=100%): compared the integrated photoluminescence intensity (425 nm excitation) and the absorbance value several values (less than 0.1 at excitation wavelength) gave the curve of the C-dots and GQDs samples with that of the references. Then used the equation:

$$\varphi_x=\varphi_{st}(K_x/K_{st})(\eta_x/\eta_{st})^2$$

Where φ is the QY, K is the slope determined by the curves and η is the refractive index. The subscript "*st*" refers to 9,10-bis (phenylethynyl) anthracene and "*x*" refers to the C-dots and GQDs.

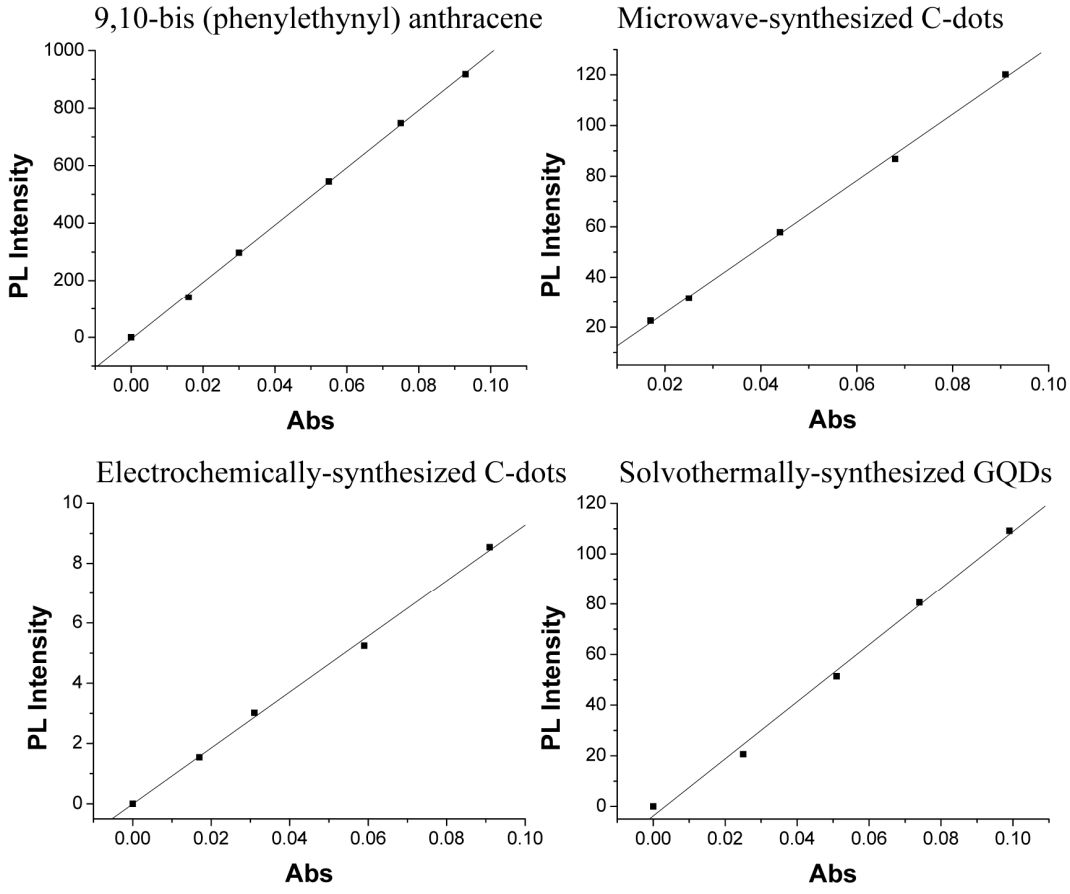

Table S1. PL QY of samples

Serials	9,10-bis (phenylethynyl) anthracene	Microwave-synthesized C-dots	Electrochemically-synthesized C-dots	Solvothermally-synthesized GQDs
K	9985.77	1313.87	92.79	1126.36
η	1.4264	1.33	1.33	1.33
Φ (%)	100	11.43	0.81	9.81

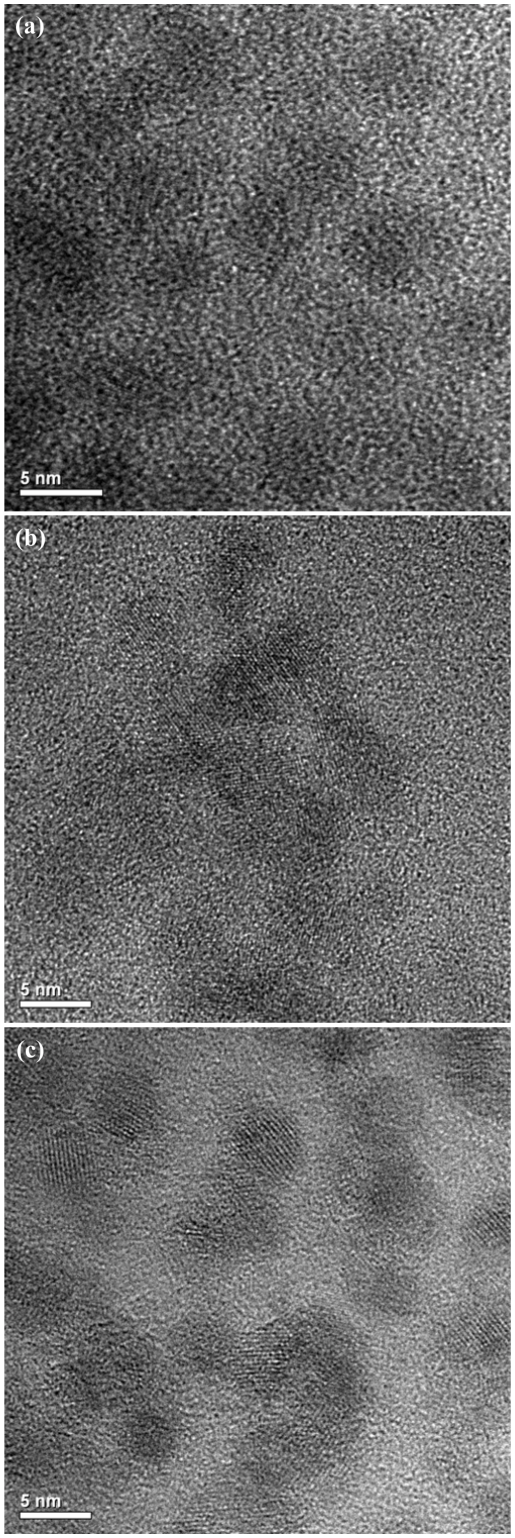

Figure S1. HRTEM images of (a) microwave-synthesized C-dots, (b) electrochemically-synthesized C-dots and (c) solvothermally-synthesized GQDs.

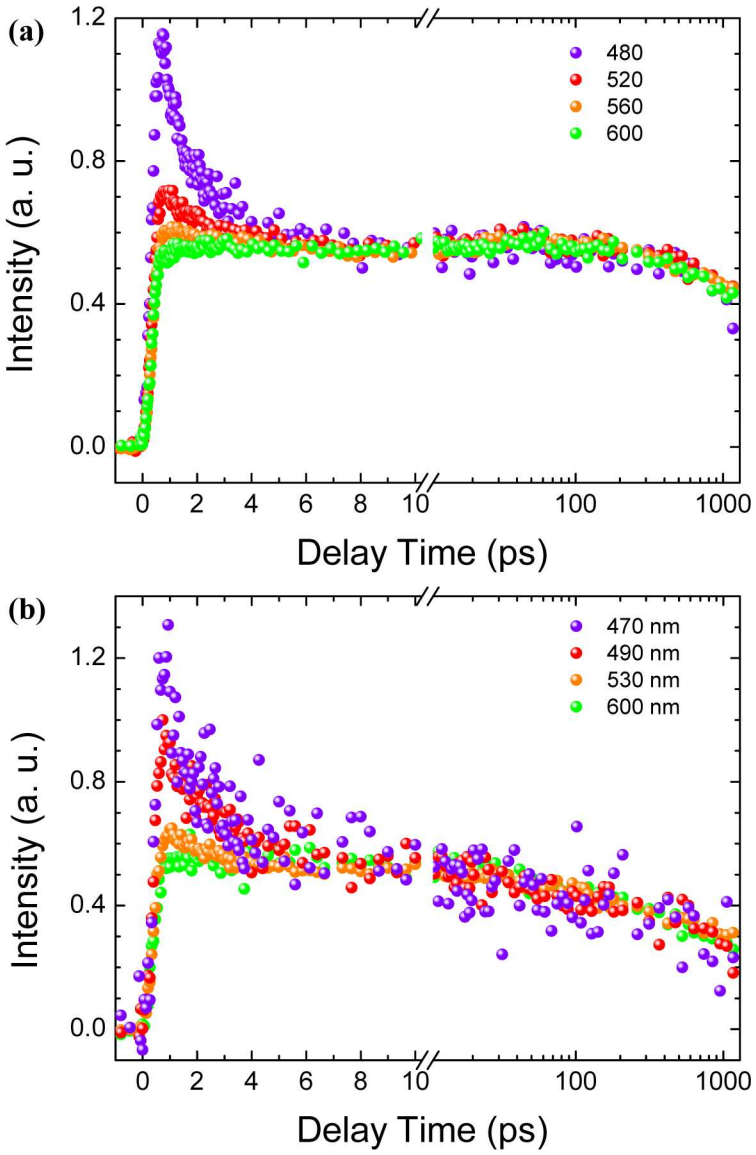

Figure S2. Wavelength-dependent PL dynamics for (a) microwave-synthesized C-dots and (b) solvothermally-synthesized GQDs at 400 nm excitation. All dynamics are normalized to the long delay time.

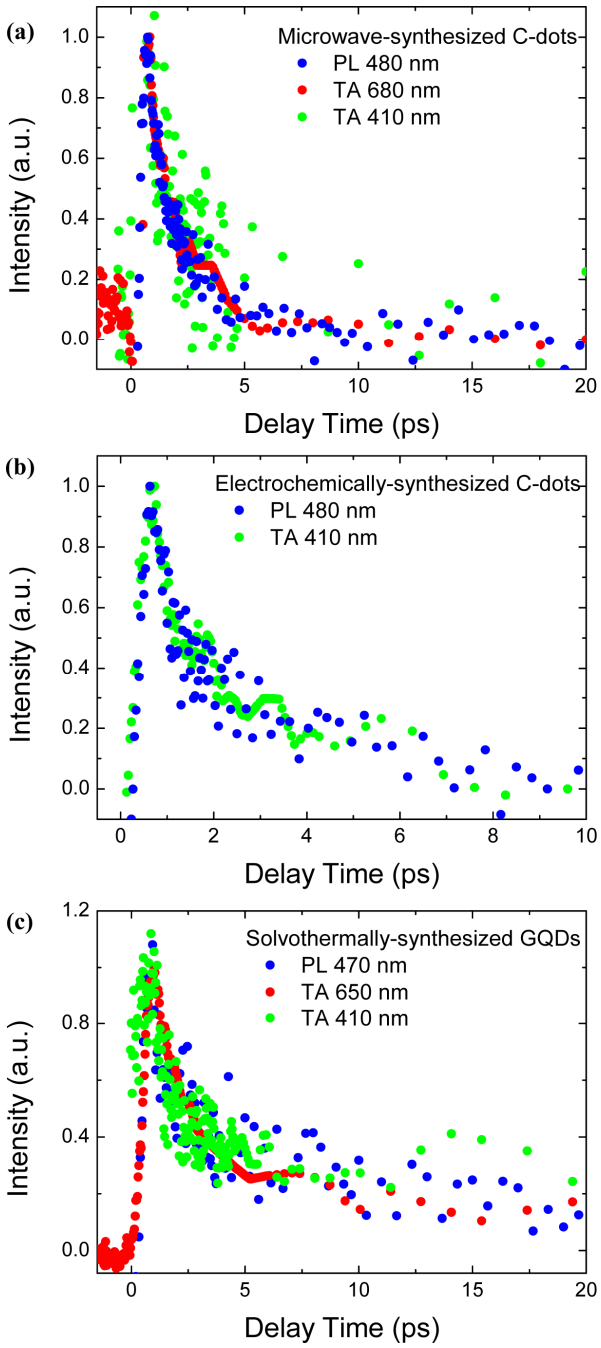

Figure S3. For short time scale, a comparative data between TA and femtosecond time-resolved PL experiments for (a) microwave-synthesized C-dots, (b) electrochemically-synthesized C-dots and (c) solvothermally-synthesized GQDs. The long lifetime component of kinetics is subtracted.

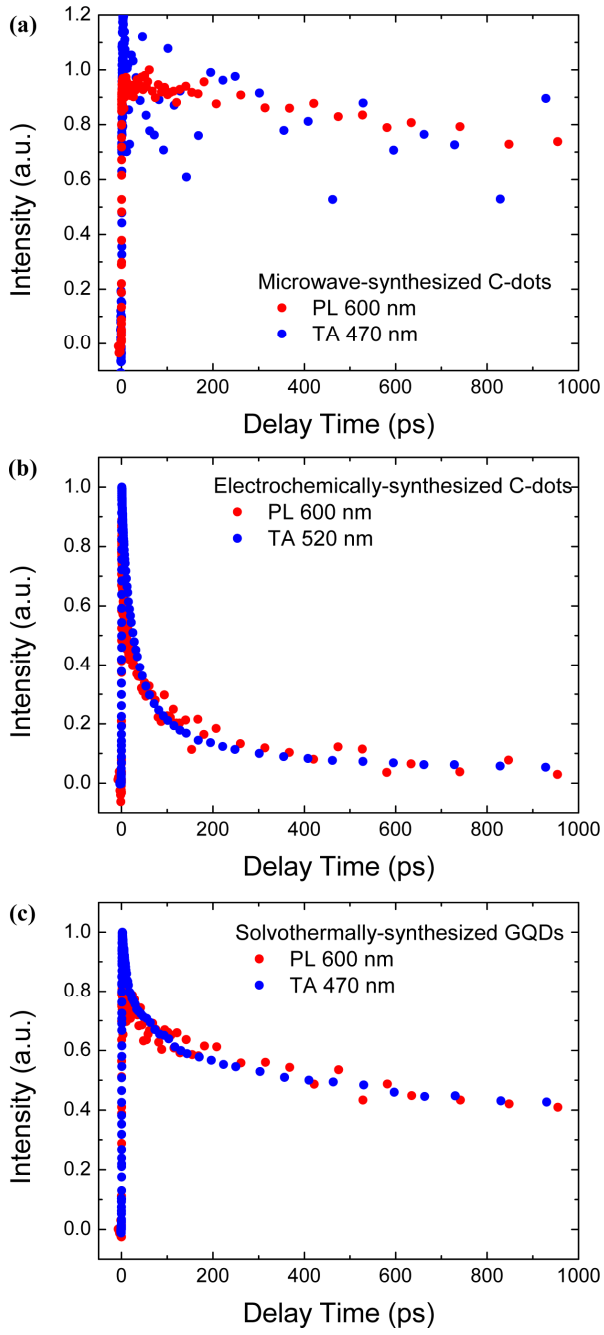

Figure S4. For long time scale, a comparative data between TA and femtosecond time-resolved PL experiments for (a) microwave-synthesized C-dots, (b) electrochemically-synthesized C-dots and (c) solvothermally-synthesized GQDs.

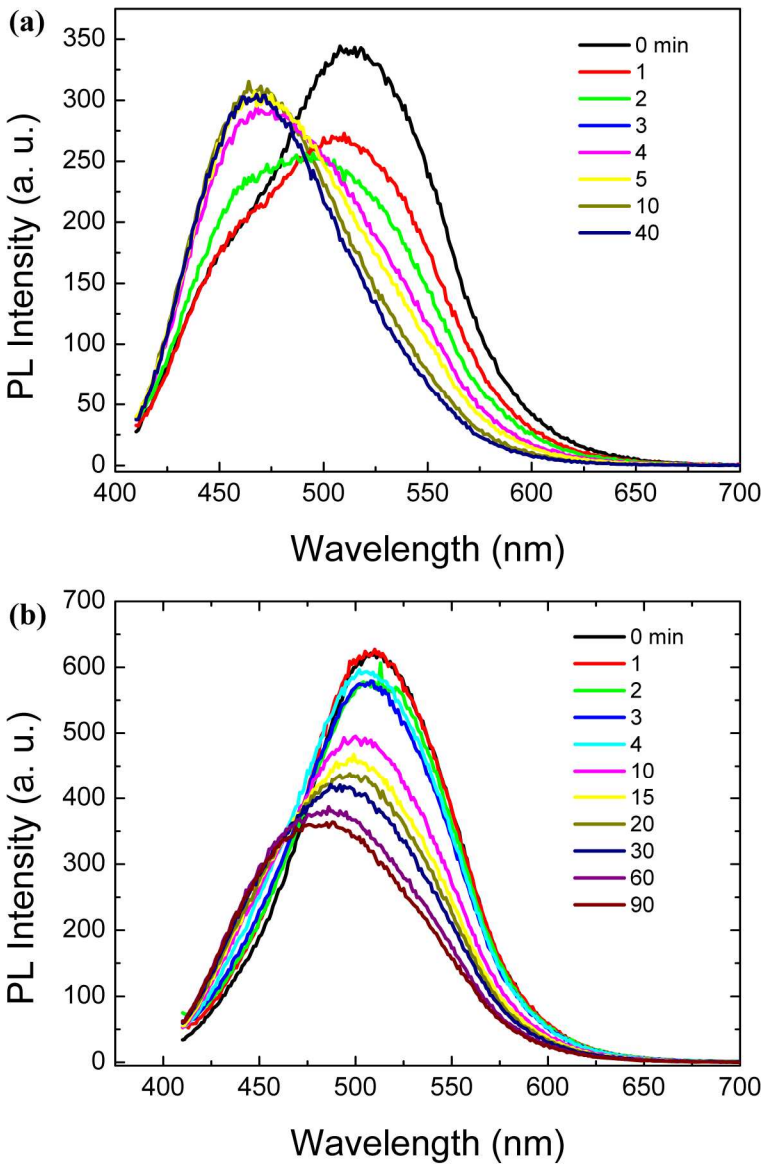

Figure S5. Steady-state PL evolution of (a) microwave-synthesized C-dots and (b) solvothermally-synthesized GQDs at different reduction times.

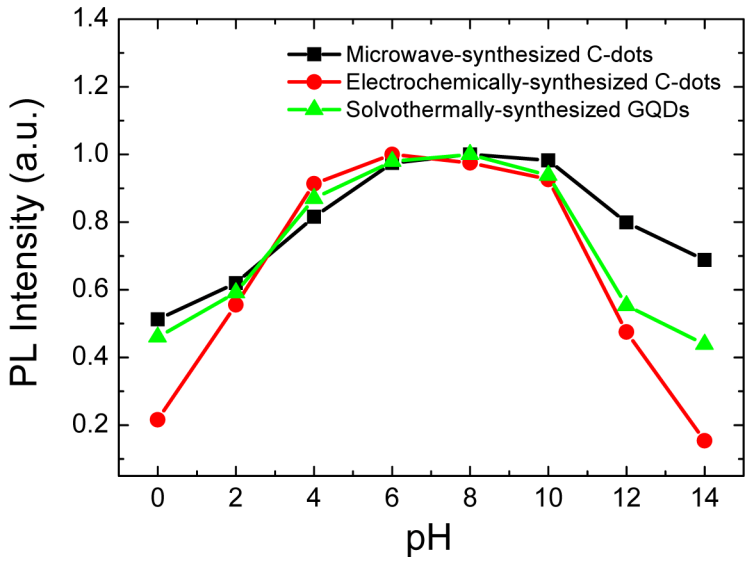

Figure S6. Normalized pH-dependent PL behavior for these studied C-dots and GQDs probed at green emission part.