

Supporting Information

S, N-Codoped oil-soluble fluorescent carbon dots for a high color-rendering WLED

Quan Wang^{1,#}, Yixun Gao^{1,#}, Boyang Wang², Yuanyuan Guo¹, Umar, Ahmad³, Yanqing Wang⁴, Yao Wang^{1,}, Siyu Lu^{2,*}, Hao Li^{1,*} and Guofu Zhou¹*

¹Guangdong Provincial Key Laboratory of Optical Information Materials and Technology, Institute of Electronic Paper Displays, South China Academy of Advanced Optoelectronics, South China Normal University, Guangzhou 510006, P. R. China.

²Henan Institute of Advanced Technology, College of Chemistry, Zhengzhou University, Zhengzhou 450001, P. R. China

³Department of Chemistry, Faculty of Science and Arts and Promising Centre for Sensors and Electronic Devices, Najran University, Najran 11001, Kingdom of Saudi Arabia.

⁴Varitronix (He Yuan) Display Technology Limited, He Yuan 517000, P. R. China.

These authors contributed equally to this work.

** Corresponding Author: Yao Wang, Email: wangyao@m.scnu.edu.cn*

Siyu Lu, Email: sylu2013@zzu.edu.cn

Hao Li, E-mail: haoli@scnu.edu.cn

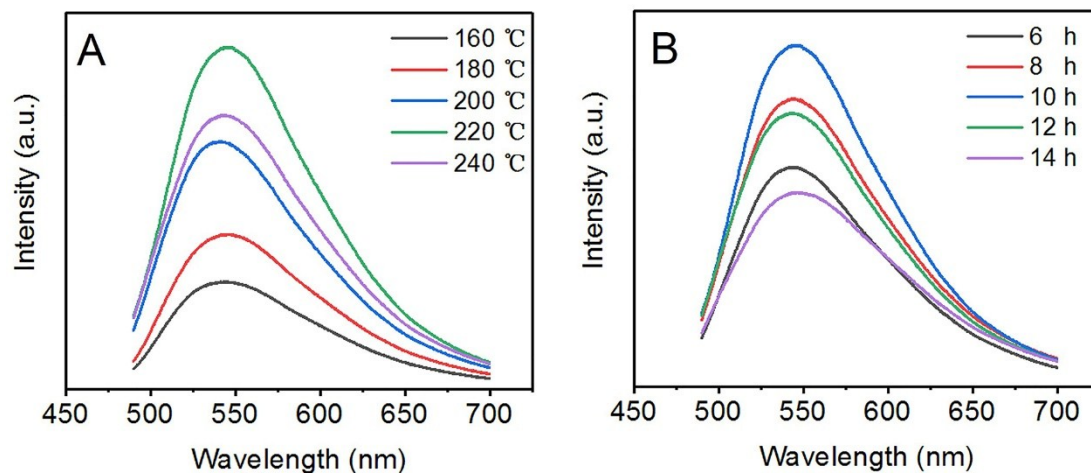


Figure S1 PL emission spectra of the S, N-codoped oil-soluble carbon dots (S, N-OCDs) under different preparation conditions: different heating temperatures for the same reaction time of 10 hours (A), and different reaction time at the same heating temperature of 220 °C (B).

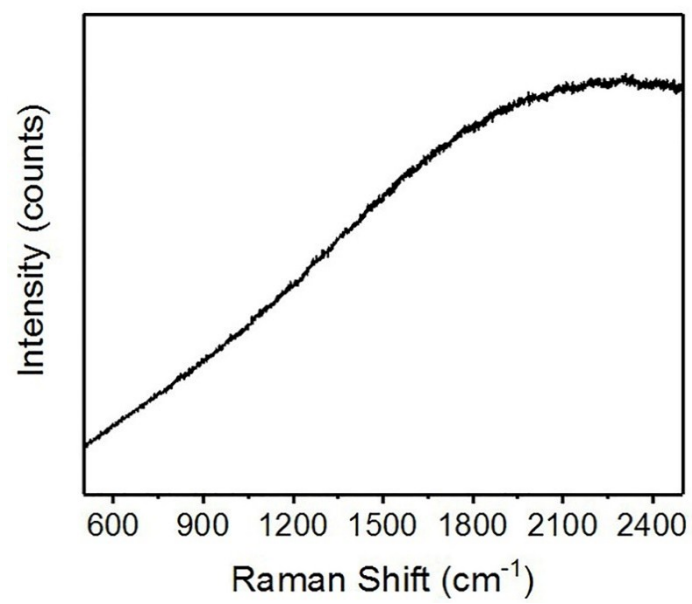


Figure S2 Raman spectrum of the S, N-OCDs

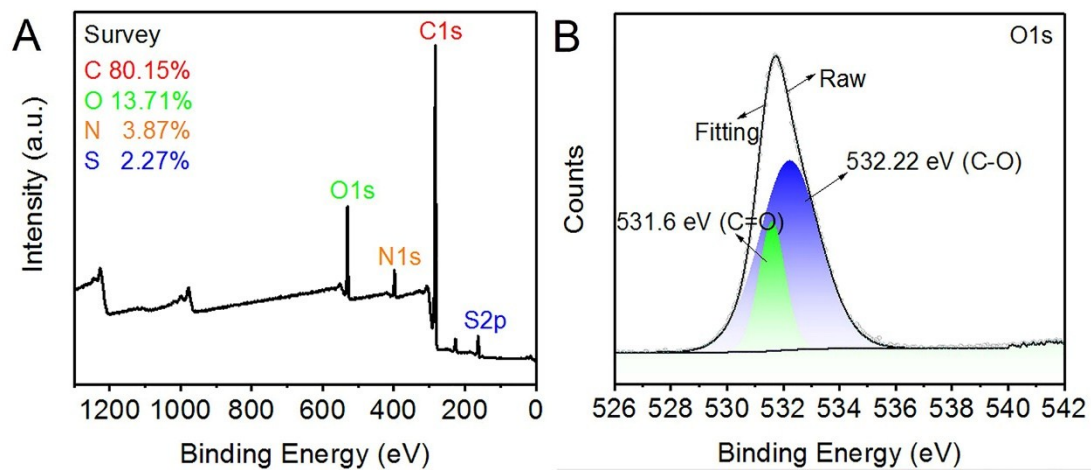


Figure S3 XPS survey spectrum (A) and O1s high-resolution XPS spectra of the S, N-OCDs (B).

Table S1 Elemental analysis results of the S, N-OCDs.

Element	C	N	H	O*	S
Content (wt%)	69.85	6.26	7.21	7.5	9.18

Notes: The content of oxygen element is obtained by calculation.

Table S2 Characteristic comparison on luminescent performances of semiconductor QDs and their modified WLEDs

Sample	CDs			Color converter	WLED				Reference
	Ex. WL (nm)	Em. WL (nm)	QY (%)		CCT (K)	CRI / Ra	CIE Color Coordinates	Working Current/ Operating Voltage	
ZnO QDs	357	561	17	ZnO QDs / epoxy composites	—	—	(0.305, 0.362)	10 mA	[S1]
ZnO QDs	350	545	1.3	ZnO QDs / Zn(MSA) ₂ composites	6517	82	(0.31,0.36)	—	[S2]
CdS QDs	425	575	—	CdS QDs / PMMA composites	4619	87.9	(0.353, 0.335)	5 mA	[S3]
Mn–Cu co- doped ZnS NPs	365	596	62	Mn–Cu codoped ZnS NPs / PVA composites	4227	—	(0.28,0.43)	3.8 V	[S4]
CdSe@ZnS core-shell NCs	452	555 613	—	CdSe@ZnS core- shell NCs / PMMA composites	3228	82.4	(0.37,0.30)	—	[S5]
S, N-OCDs	480	545	21.08	S, N-CDs / epoxy composites	5389	88.4	(0.33,0.30)	20 mA / 4 V	This work

Notes: “QDs” is the abbreviation of quantum dots; “NPs” is the abbreviation of nanoparticles; “NCs” is the abbreviation of nanocrystals.

Table S3 The oil-solubility of S, N-OCDs in different solvents

Solvent type	volume	The mass of S, N-OCDs
acetone	1 mL	> 10 mg
DMF	1 mL	> 10 mg
ethyl alcohol	1 mL	~ 2 mg
water	1 mL	< 0.1 mg

References

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