Journal Name

ARTICLE

Green luminescence origin of carbon quantum dots:specific luminescence bands originate from oxidized carbon groups

Zhiguo Sun, Xiaoming Li, Ye Wu, Changting Wei, Haibo Zeng**

Institute of Optoelectronics & Nanomaterials

MIIT Key Laboratory of Advanced Display Materials and Devices College of Materials Science and Engineering

Nanjing University of Science and Technology

Nanjing 210094, China

Journal Name

ARTICLE

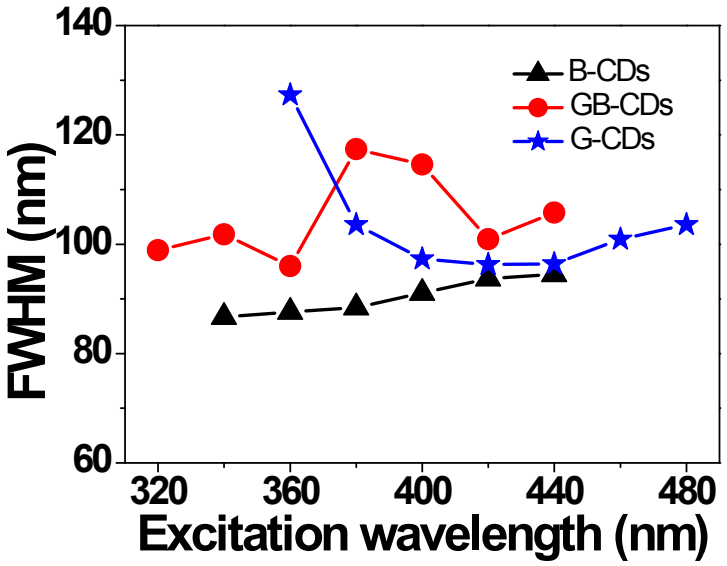

Figure S1. Full width at half maximum of the emission spectra under different excitations.

Journal Name

ARTICLE

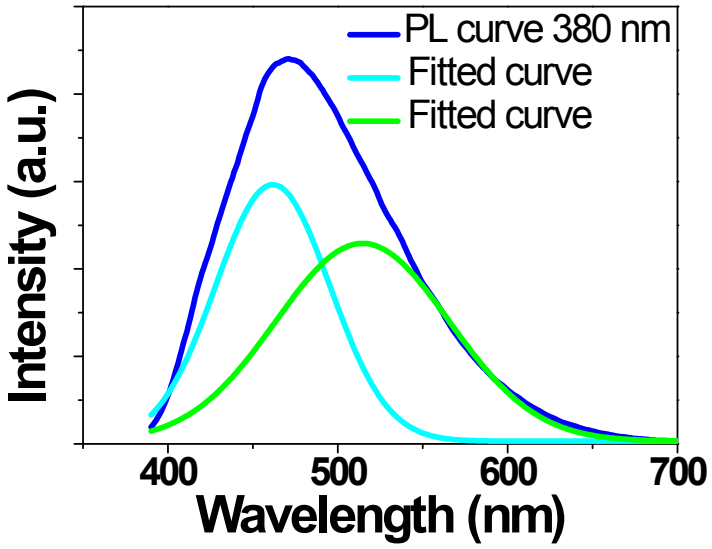

Figure S2. Gaussian fitted PL curve of M-CDs (1:1) excited at 380 nm.

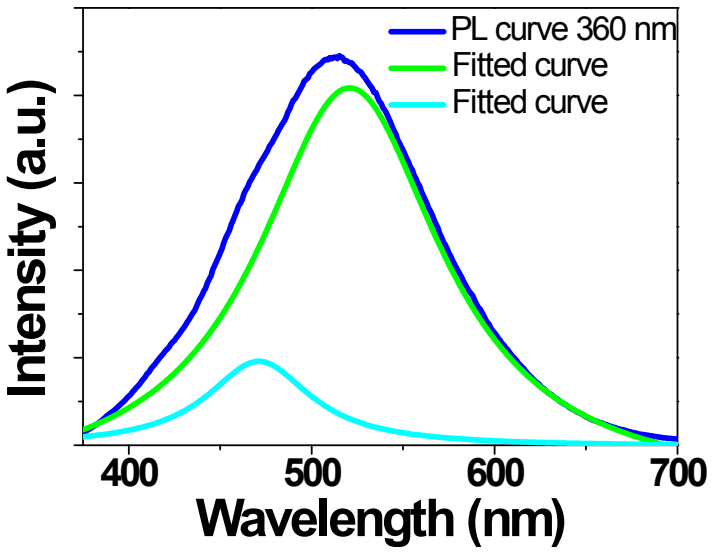

Figure S3. Gaussian fitted PL curve of M-CDs (1:2) excited at 360 nm.

Journal Name

ARTICLE

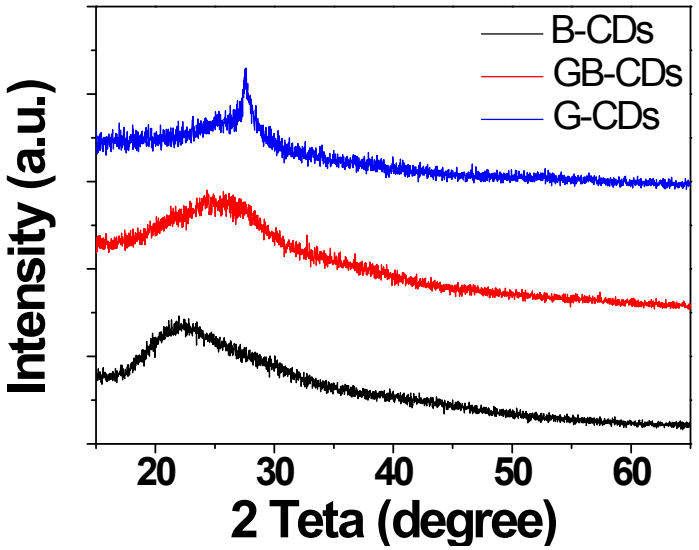

Figure S4. XRD patterns of the three samples.

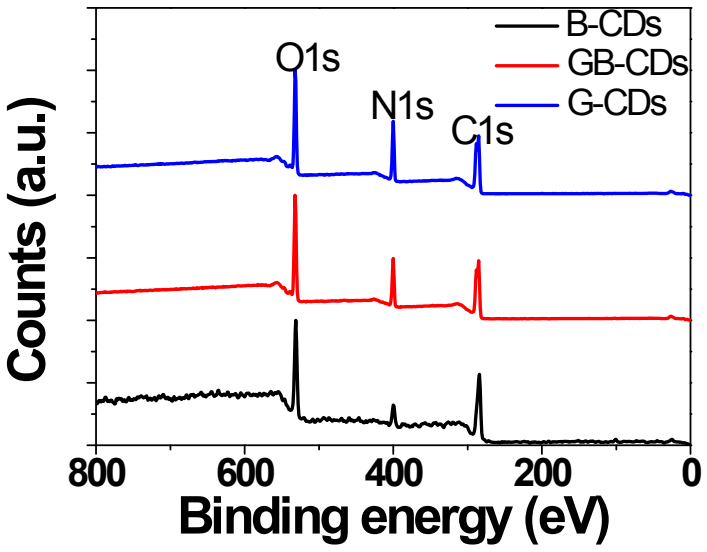

Figure S5. XPS analyses of the three samples.

Journal Name

ARTICLE

Table S1. Detailed element analysis of the three samples.

Sample	C	N	O
B-CDs	53.99	16.40	29.61
GB-CDs	55.31	17.81	26.88
G-CDs	54.30	20.72	24.98

Table S1. Detailed element analysis of the three samples.

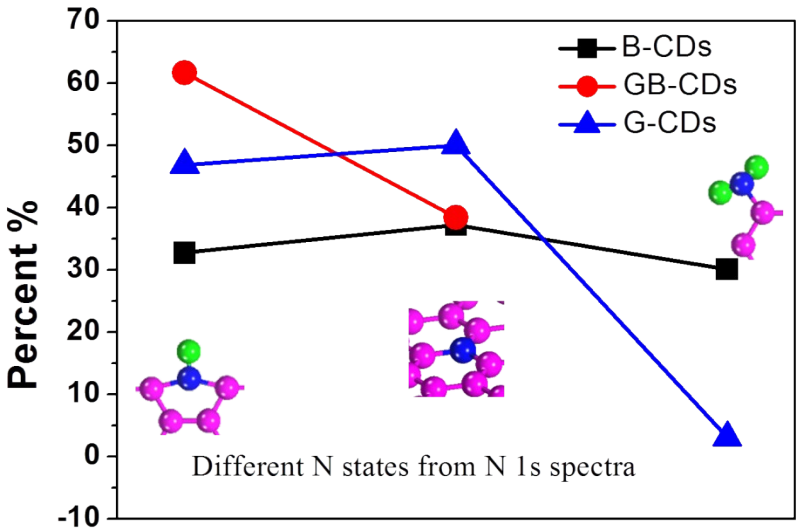

Figure S6. Different chemical states of nitrogen obtained from N1s analysis. The three states from left to right are pyrrolic N, doping N and, amino nitrogen, respectively.

Journal Name

ARTICLE

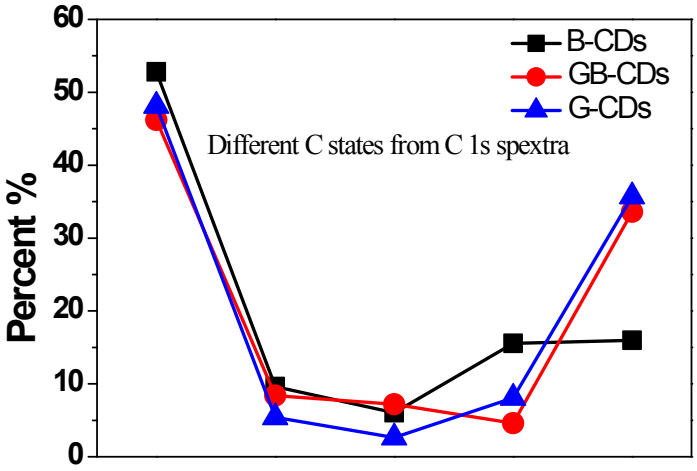

Figure S7. Different chemical states of carbon obtained from C1s analysis. The five states from left to right are C=C, C-C, C-N, C-O and C=O, respectively.

Journal Name

ARTICLE

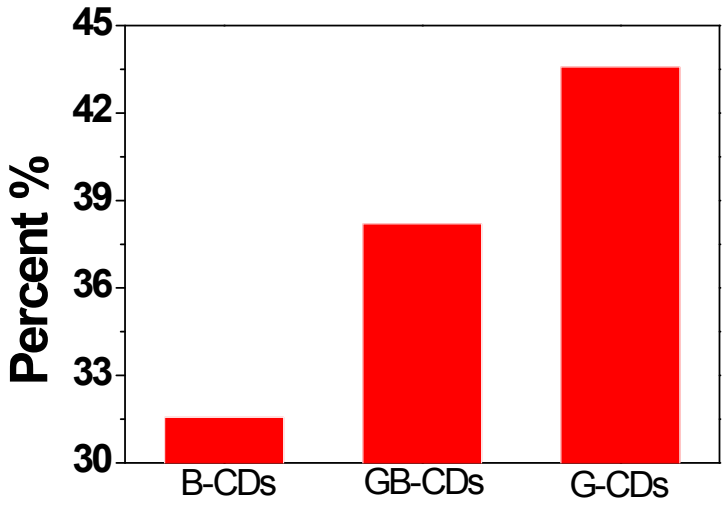

Figure S8. The percent of oxidized carbon (carbonyl and carboxyl groups) in the three samples.

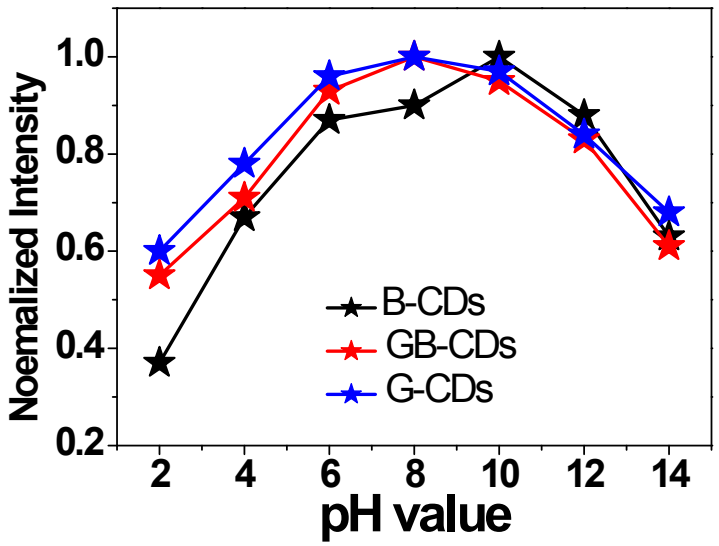

Figure S9. Normalized pH-dependent PL behavior for the three samples detected at green emission part.

Journal Name

ARTICLE

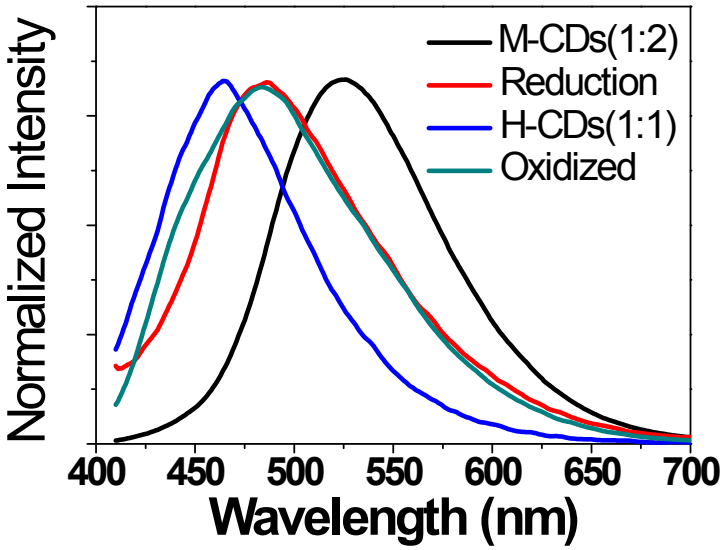

Figure S10. PL evolution of carbon dots after oxidization or reduction.

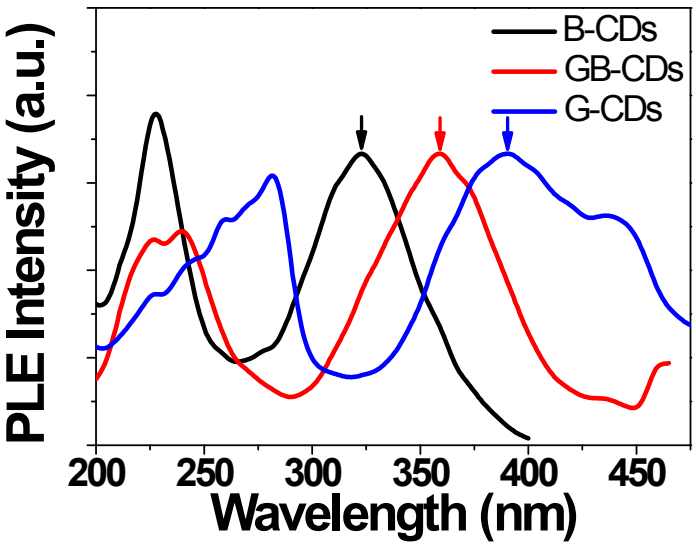

Figure S11. PLE spectra of the three samples, which were detected at 410 nm, 463 nm and 524 nm, respectively.

Journal Name

ARTICLE

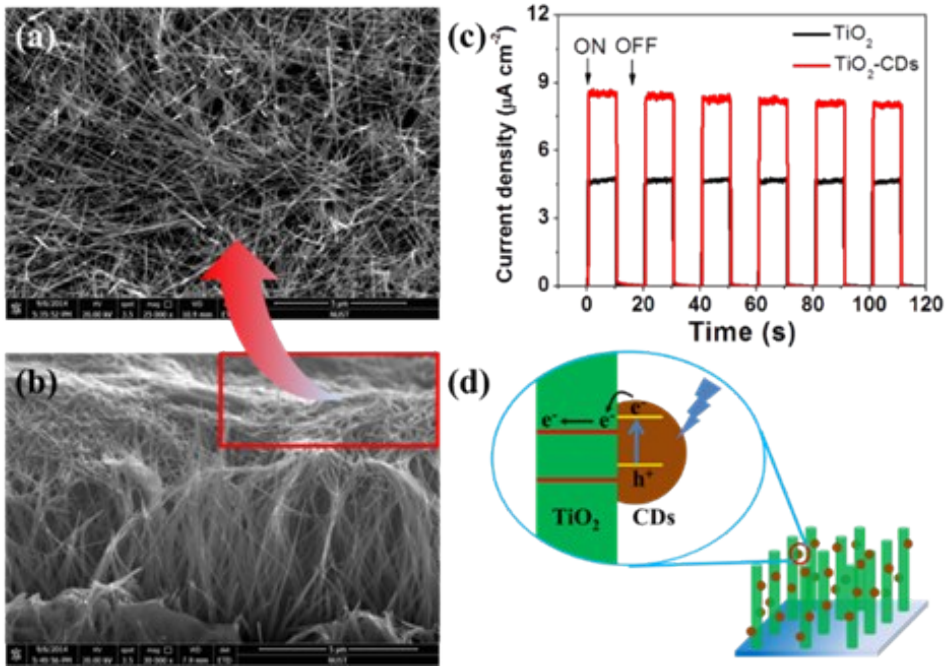

Figure S12. (a) Top view of the part marked with a red box in (b). (b) Cross sectional view of the titanium oxide nanowire arrays grown on Ti foil. (c) ON-OFF photocurrent-time curves of TiO2 nanowire arrays decorated with carbon dots. (d) The possible electron transfer mechanism of CDs/TiO2 composite under visible light irradiation.

Journal Name

ARTICLE

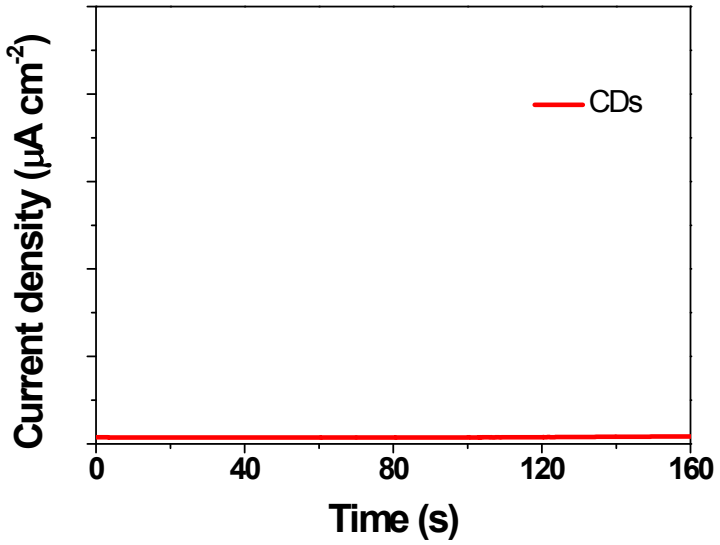

Figure S13. Photocurrent response of carbon dots only under the irradiation of visible light.

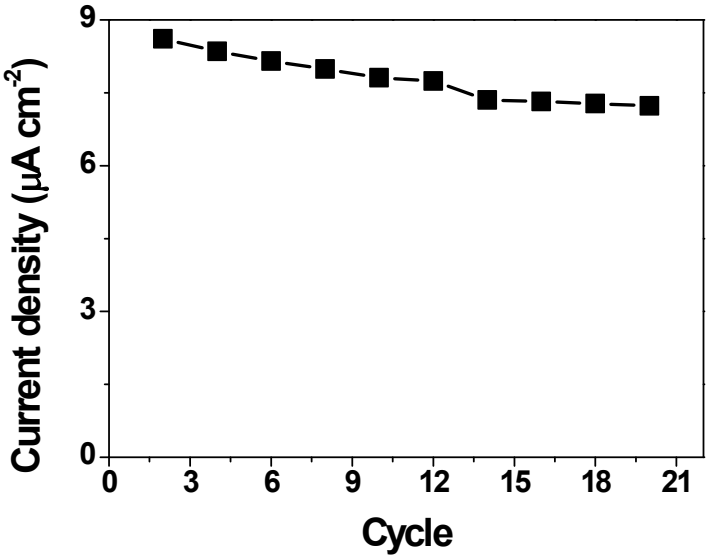

Figure S14. Cycle test of the nanowire arrays decorated with CDs under visible light irradiation. There is a small decrease after 20 cycles, which may be due to the fall off of CDs.