Supporting Information

Concentration induced multi-color emission in carbon dots: origination from triple fluorescent centers

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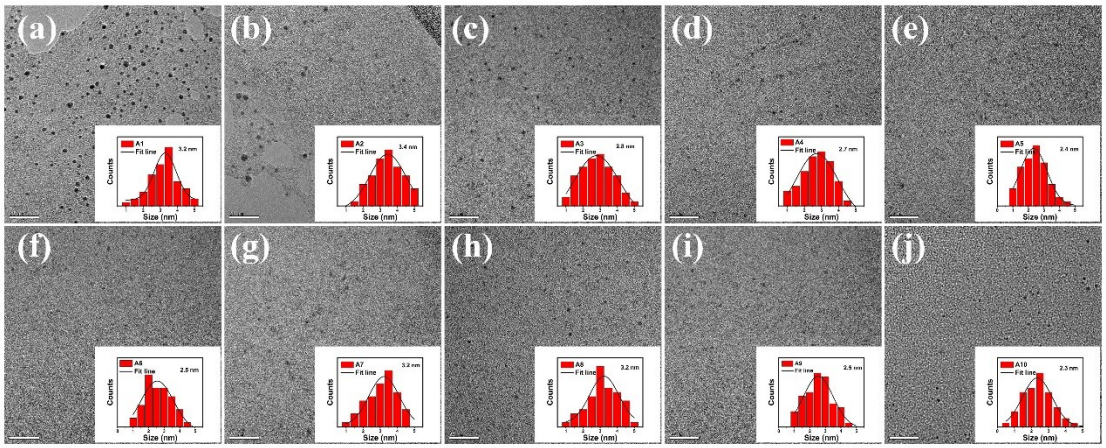

Fig. S1 TEM image and histograms of the particle size distribution of A1-A10. The scale bars in all the images are 20 nm.

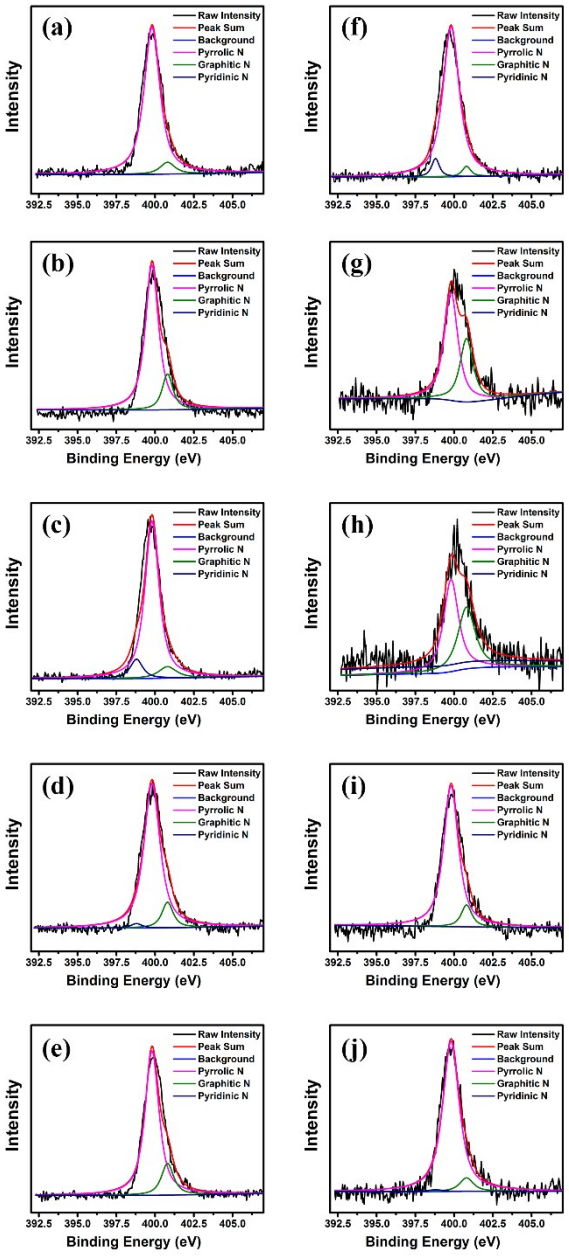

Fig. S2 High-resolution XPS spectrum of N1s in (a-j) A1-A10, the N composition in CD were analysed by Gaussian decomposition.

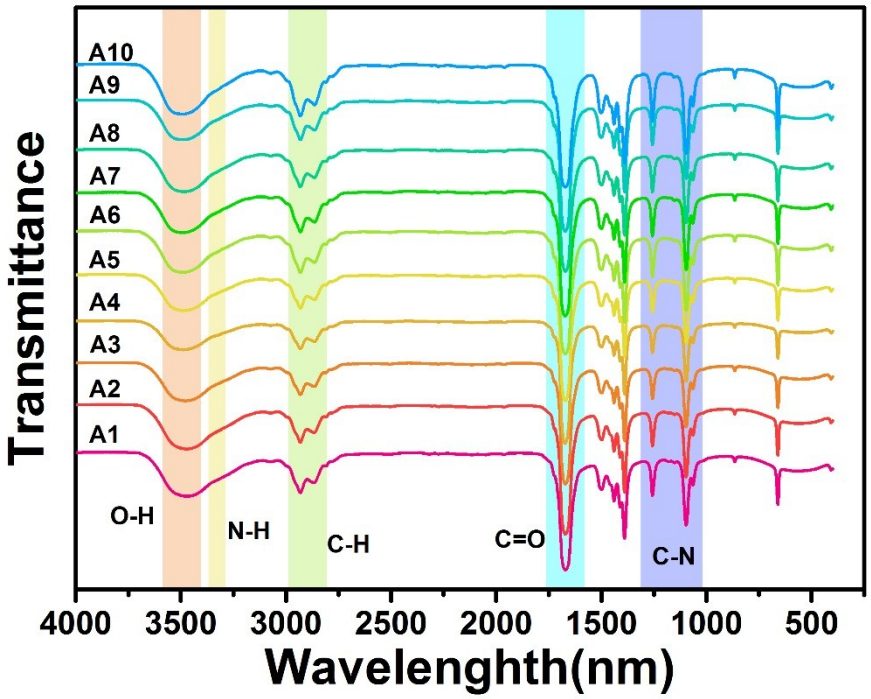

Fig. S3 FT-IR spectrum of synthesized carbon dots in DMF.

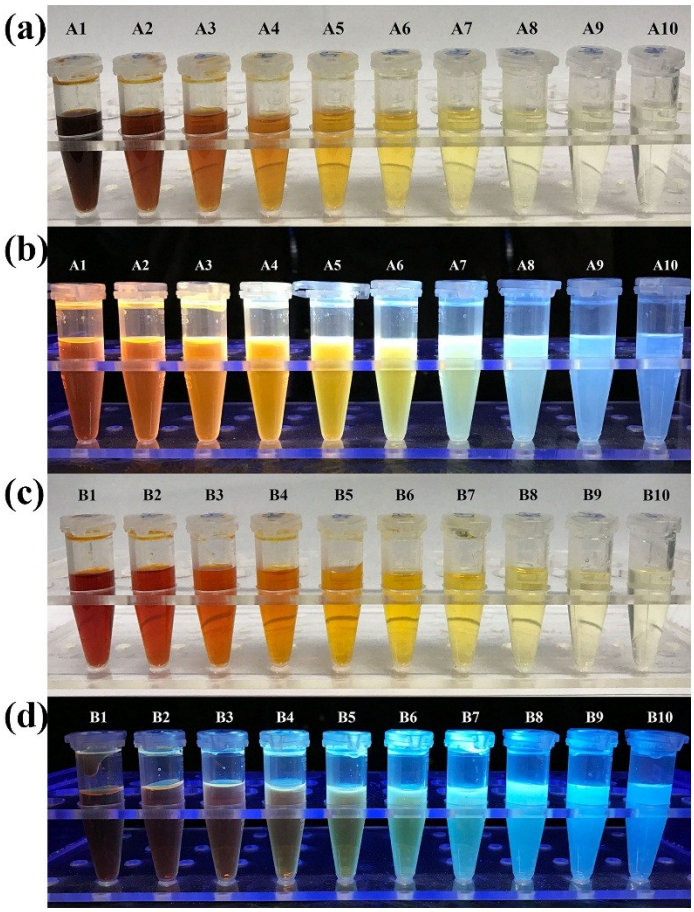

Fig. S4 Photograph of CDs under daylight and 365 nm UV-light with various concentration in (a, b) DMF and (c, d) H2O, respectively.

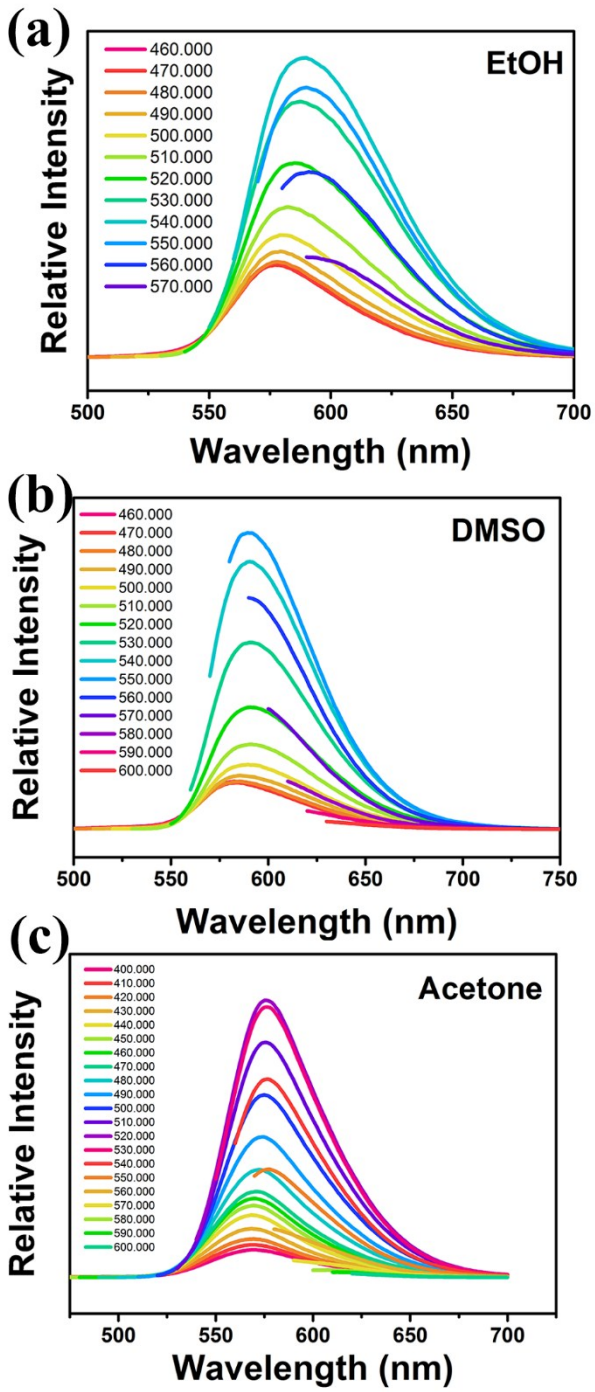

Fig. S5 Emission spectrum of CD in (a) EtOH (b) DMSO and (c) Acetone with dependent excitation.

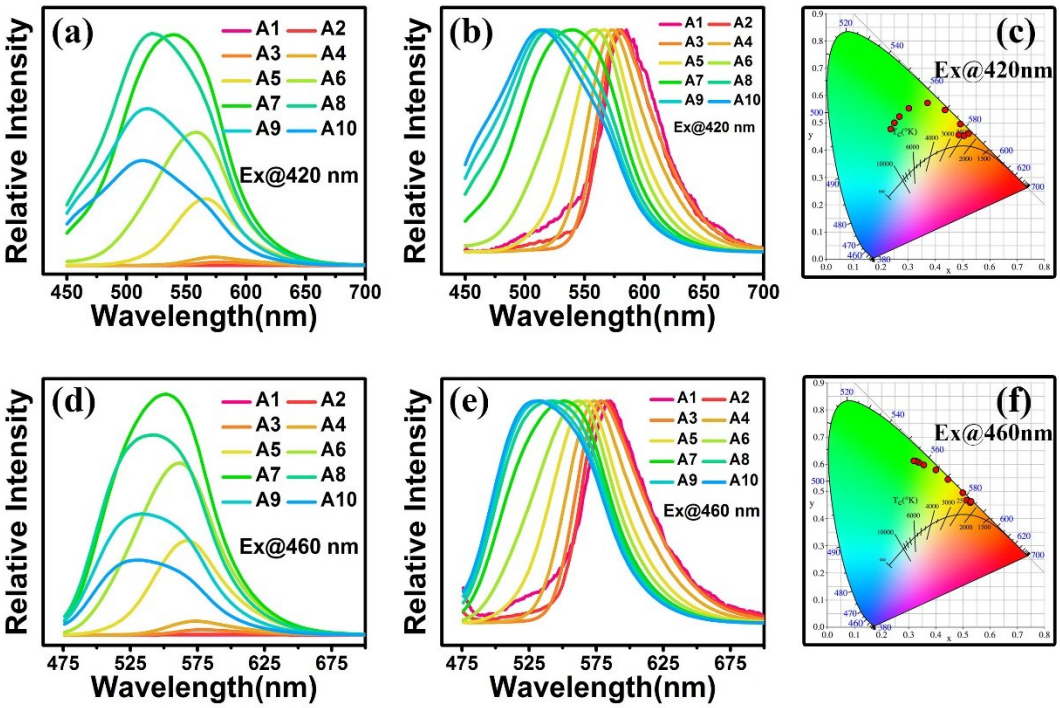

Fig. S6 Photoluminescent properties of sample A1-A10 under excitation of (a) 420nm and (d) 460nm. Wavelength change of normalized PL A1-A10 under excitation of (b) 420nm and (e) 460nm. CIE coordinate of A1-A10 under excitation of (c) 420nm and (f) 460nm.

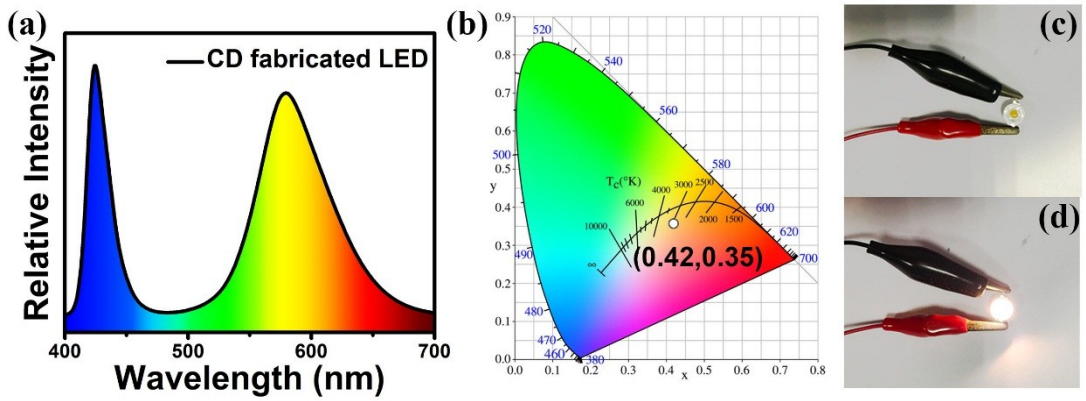

Fig. S7 (a) Electroluminescence spectrum and (b) CIE coordinate of 420 nm InGaN blue chip with CD fabricated LED device. Photographs of CD fabricated LED with (c) switch off and (d) switch on.

The fluorescence decay curves fitted according to a triple-exponential function:

$I(t) = A_1e^{-t/\tau1} + A_2e^{-t/\tau2} + A_3e^{-t/\tau3}$

The average lifetime was calculated according to $\tau_{average} = \Sigma A_i\tau_i$.

Table. S1 Original concentration of CDs in DMF and H_2O

DMF	**A0**	**A1**	**A2**	**A3**	**A4**	**A5**	**A6**	**A7**	**A8**	**A9**	**A10**
c (g/ml)	0.5g CD in 0.5 ml DMF	0.1* c(A0)	0.5* c(A1)	0.5* c(A2)	0.5* c(A3)	0.5* c(A4)	0.5* c(A5)	0.5* c(A6)	0.5* c(A7)	0.5* c(A8)	0.5* c(A9)
Density (g/ml)		0.7192	0.7248	0.7202	0.7208	0.7215	0.7128	0.7162	0.7154	0.7176	0.7202
H_2O	**B0**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**	**B10**
c (g/ml)	0.5g CD in 0.5 ml H_2O	0.1* c(B0)	0.5* c(B1)	0.5* c(B2)	0.5* c(B3)	0.5* c(B4)	0.5* c(B5)	0.5* c(B6)	0.5* c(B7)	0.5* c(B8)	0.5* c(B9)