

## Supporting information

The spectral heterogeneity and size  
distribution of the carbon dots derived from  
time-resolved fluorescence studies

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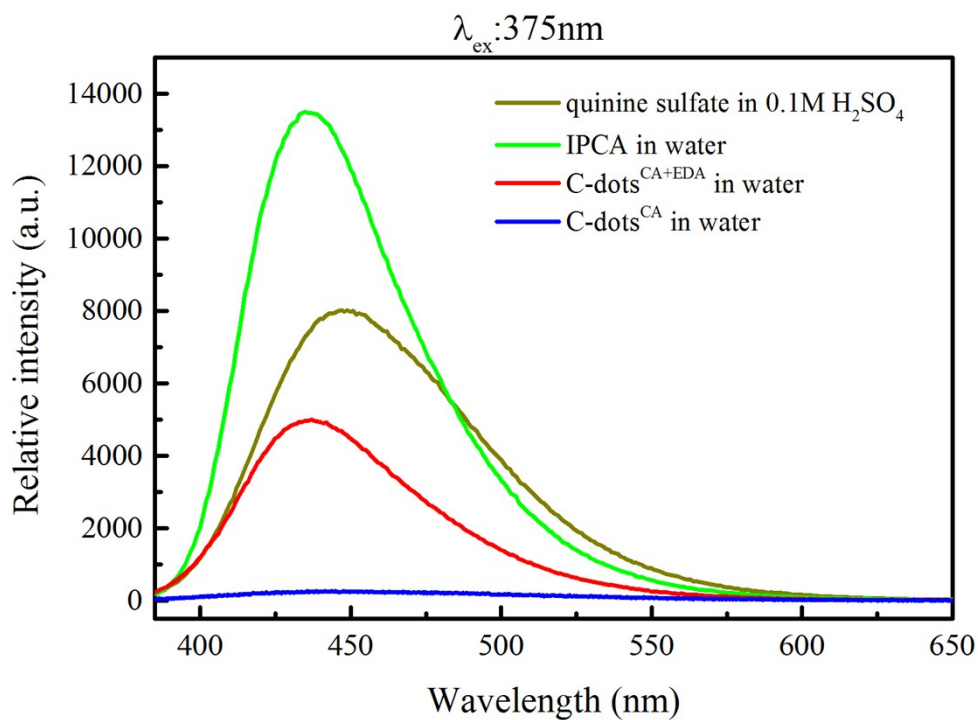


Fig. S<sub>1</sub>: The relative fluorescence intensity of the IPCA, C-dots<sup>CA+EDA</sup> and C-dots<sup>CA</sup> and quinine sulfate in 0.1 M H<sub>2</sub>SO<sub>4</sub>. In order to calibrated the difference caused by the absorbance, the fluorescence intensity of each species has been divided by  $1-10^{-\text{absorbance}}$ . The IPCA was prepared by collecting the small emissive species that can penetrate through the dialysis membrane, and purified using the C18 column.

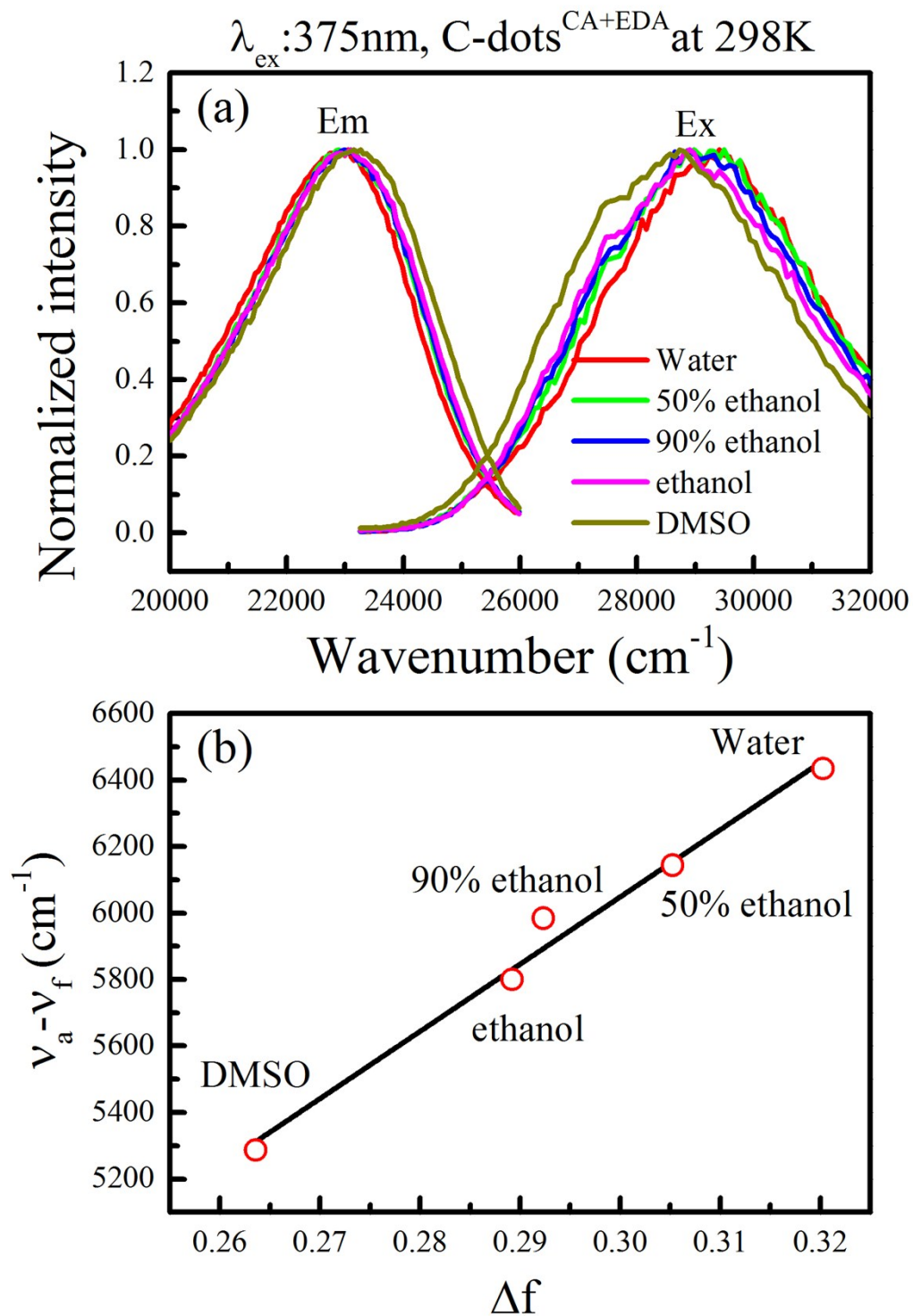


Fig. S<sub>2</sub>: (a) the steady state emission and excitation spectra of the C-dots<sup>CA+EDA</sup> dissolved in different solvents. (b) The Lippert plot of the C-dots<sup>CA+EDA</sup>, in which the  $\Delta f = \frac{\epsilon - 1}{2\epsilon + 1} - \frac{n^2 - 1}{2n^2 + 1}$  ( $\epsilon$ :the dielectric constant of solvent,  $n$ :the refractive index of solvent)

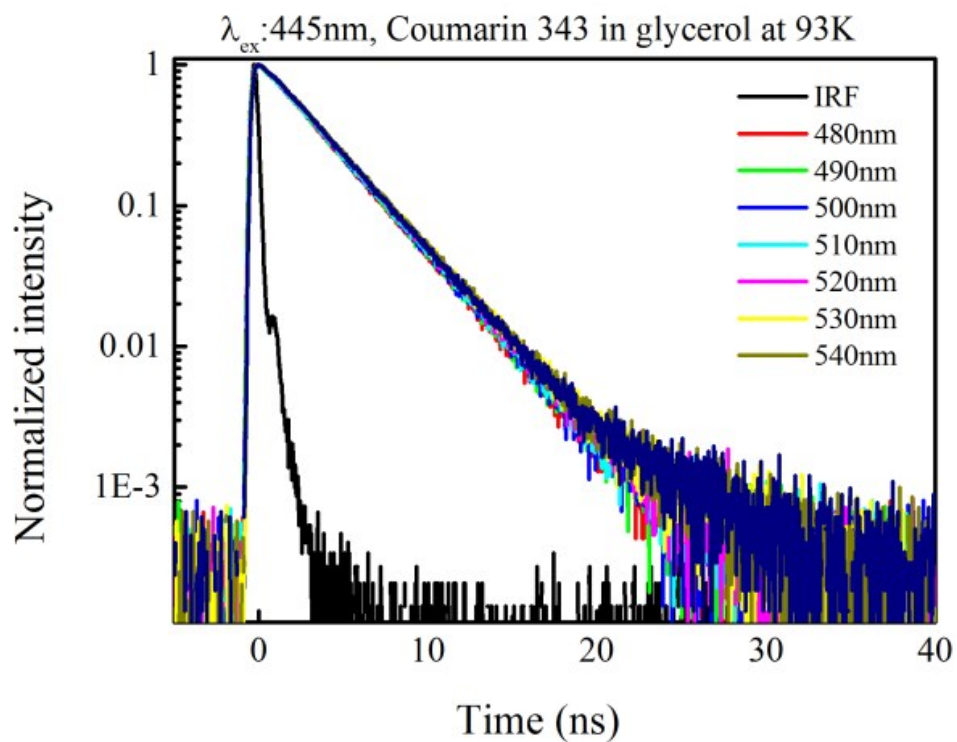


Fig. S<sub>3</sub>: The fluorescence decay dynamics of coumarin 343 in glycerol at 93 K. As illustrated, the coumarin 343 shows similar fluorescence decay dynamics at different emission wavelengths, which indicates that the spectral relaxation dynamics of the glycerol were completely inhibited at this temperature.

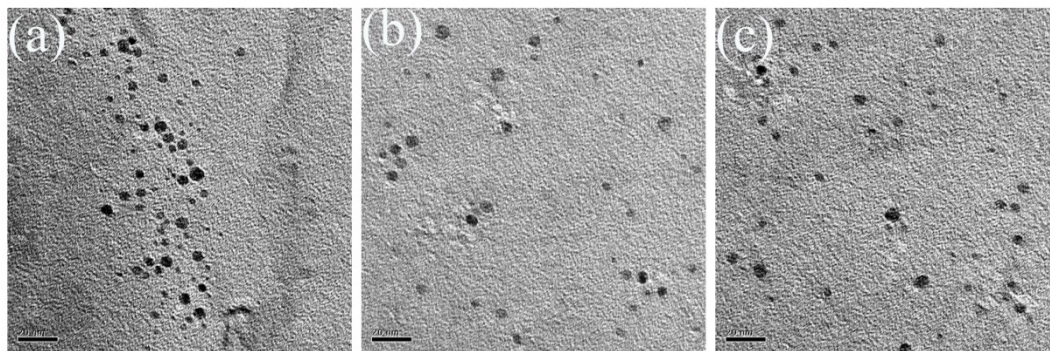


Fig. S<sub>4</sub>: The TEM images for the C-dots<sup>CA+EDA</sup>.

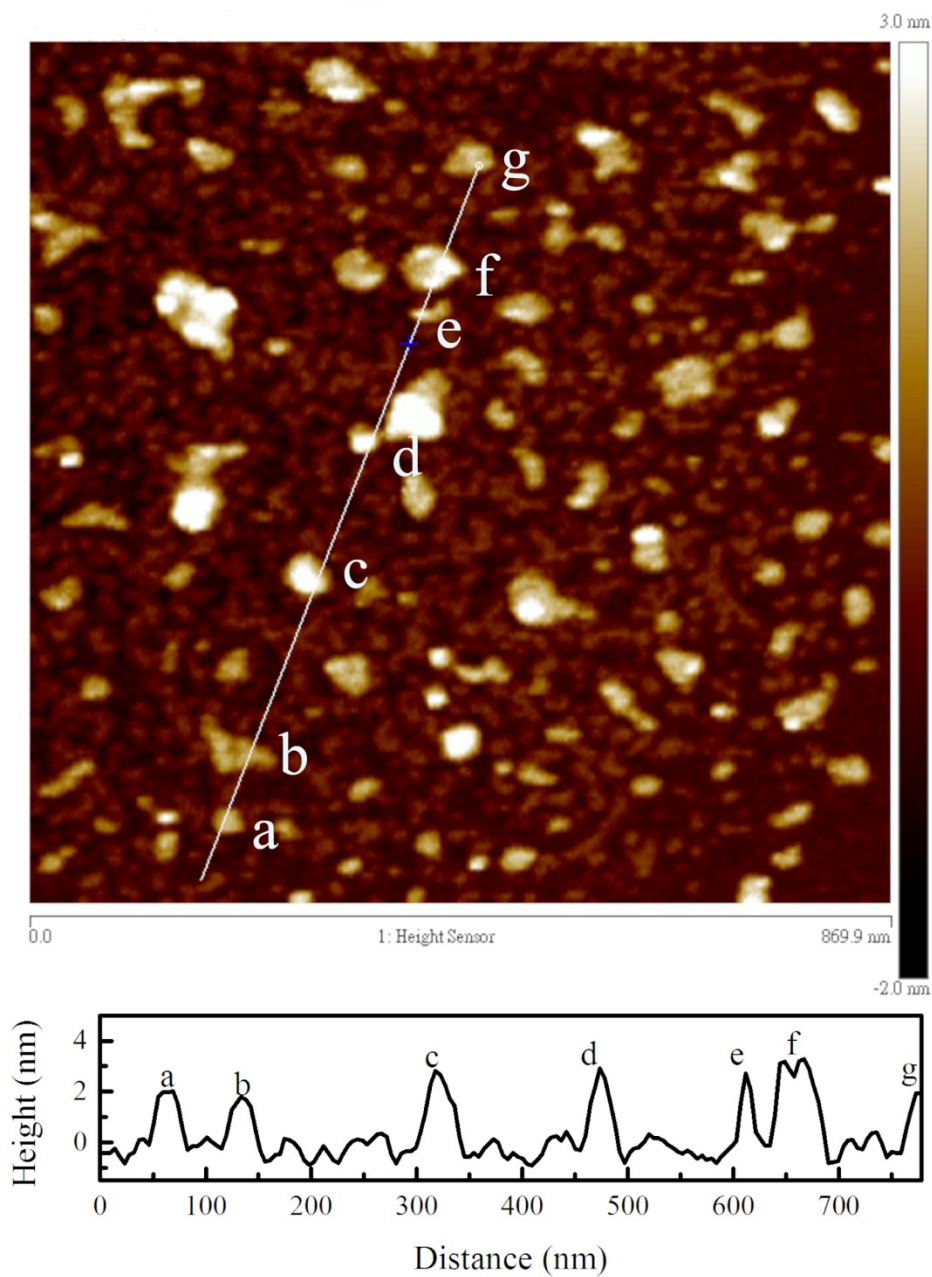


Fig. S<sub>5</sub>: The AFM images for the C-dots<sup>CA+EDA</sup>. The lower panel shows the cross-section along the white line. As depicted, the thickness of the C-dots<sup>CA+EDA</sup> are about 2-3 nm.

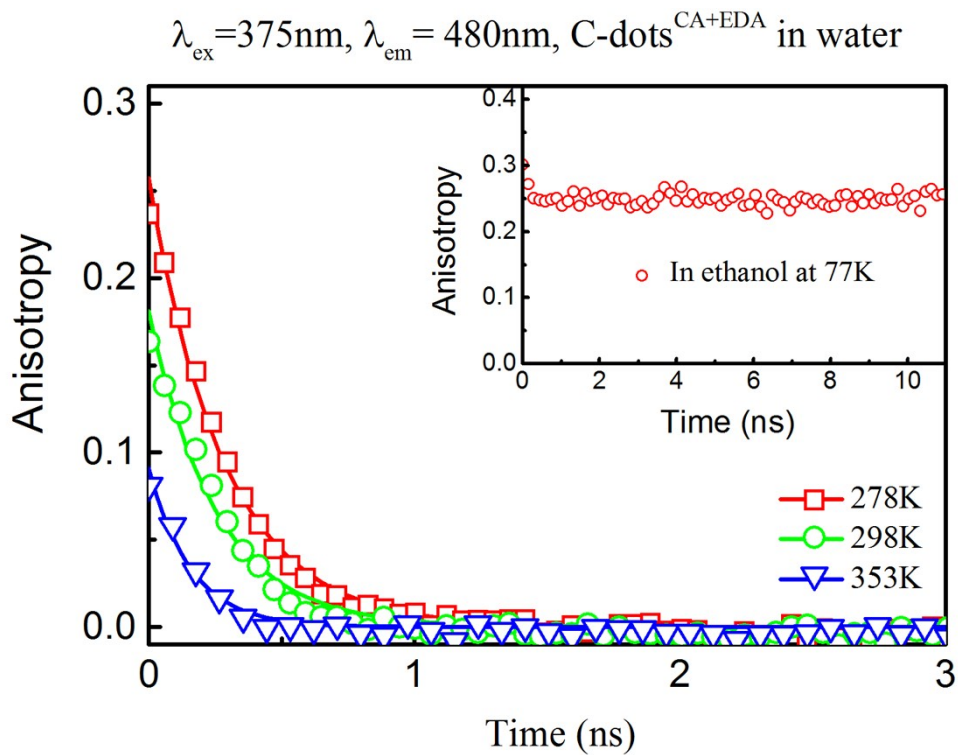


Fig. S<sub>5</sub>: The  $r(t)$  of the C-dots<sup>CA+EDA</sup> at different temperatures. The inset shows the  $r(t)$  of the C-dots<sup>CA+EDA</sup> in ethanol at 77 K. The results indicate that the  $r(t)$  dynamics is associated with the rotation or the structural fluctuation of the C-dots in solution