# Supplementary Information (SI)

# UV photobleaching of carbon nanodots investigated by in-situ optical methods

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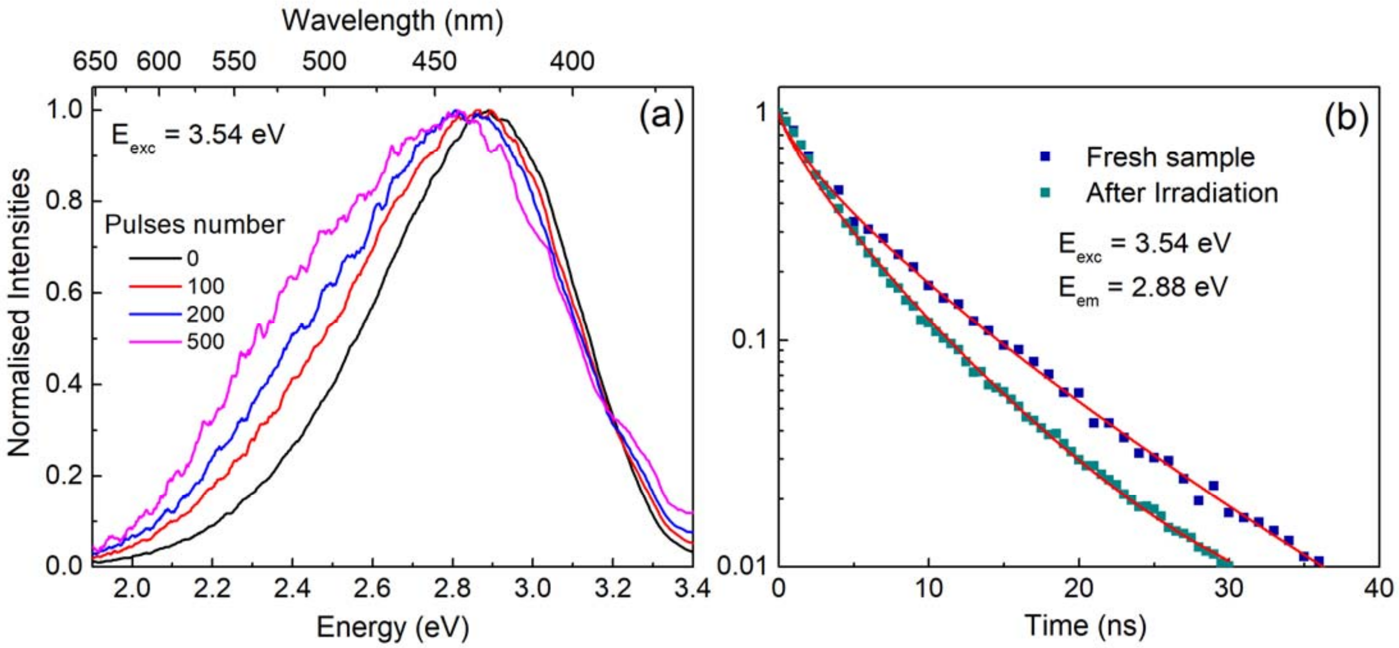

**Figure S1. (a)** Normalized photoluminescence emission spectra of CDs collected in situ during a photobleaching experiment, after different numbers of pulses received by the sample. (b) Excited-state decay kinetics before (blue dots) and after (green dots) irradiation. Both datasets were fitted by a stretched-exponential decay curve, obtaining an average excited-state lifetime of $\mathbf{4.9} \pm \mathbf{0.5}$ $\mathbf{ns}$ and a β value of $\mathbf{0.76} \pm \mathbf{0.3}$ for data acquired before irradiation, and a value of $\mathbf{3.9} \pm \mathbf{0.4}$ $\mathbf{ns}$ with a value of β of $\mathbf{0.79} \pm \mathbf{0.3}$ after irradiation.

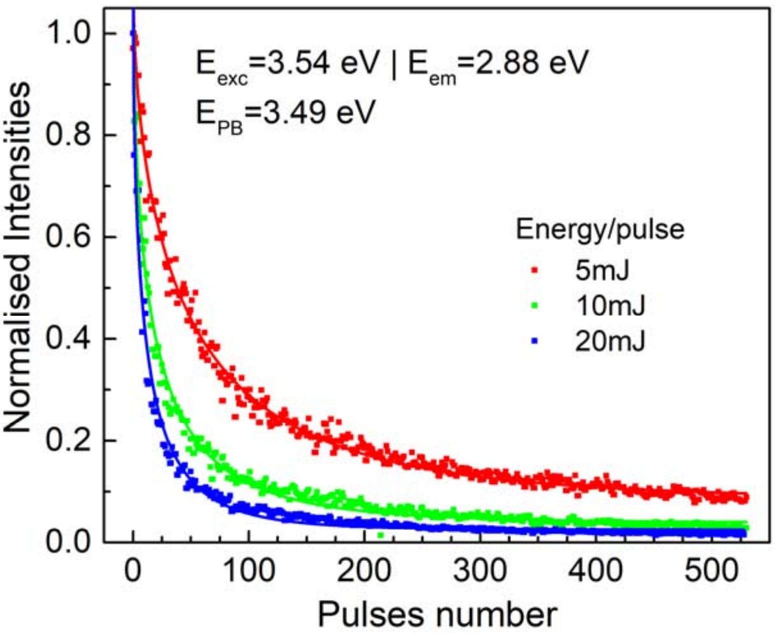

**Figure S2.** Fluorescence PB kinetics of CDs as observed at three different PB laser powers: 5, 10 and 20 mJ/pulse. The three datasets were fitted by stretched-exponential kinetics as discussed in the main paper, obtaining the following fit parameters: $\mathbf{N_0} = \mathbf{48 \pm 5}$ and $\boldsymbol{\beta} = \mathbf{0.60 \pm 0.05}$ for the 5 mJ/pulse kinetics, $\mathbf{N_0} = \mathbf{18 \pm 2}$ and $\boldsymbol{\beta} = \mathbf{0.55 \pm 0.05}$ for the 10 mJ/pulse kinetics, $\mathbf{N_0} = \mathbf{11 \pm 2}$ and $\boldsymbol{\beta} = \mathbf{0.57 \pm 0.05}$ for the 20 mJ/pulse kinetics.

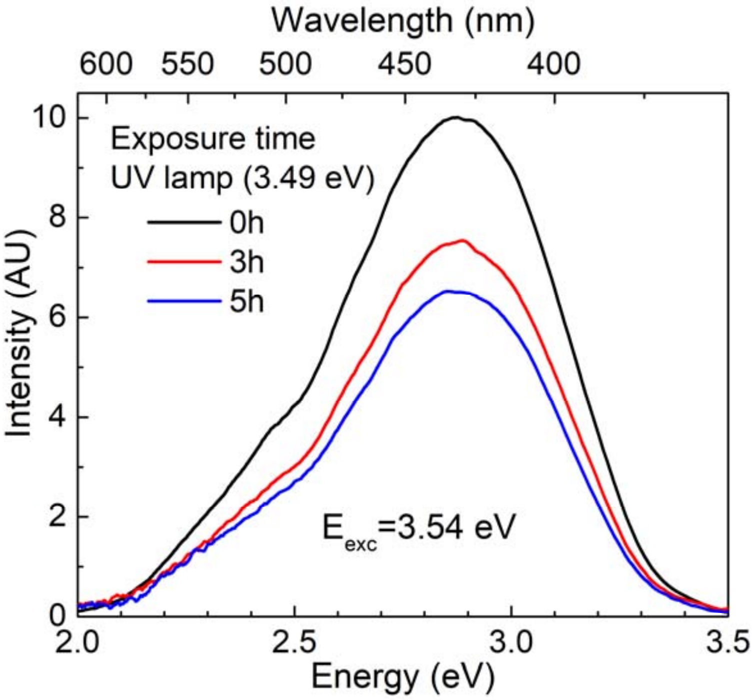

**Figure S3:** Photoluminescence emission spectra of CDs before and after exposition to the light from an UV lamp, in the spectral interval 340 – 360 nm.

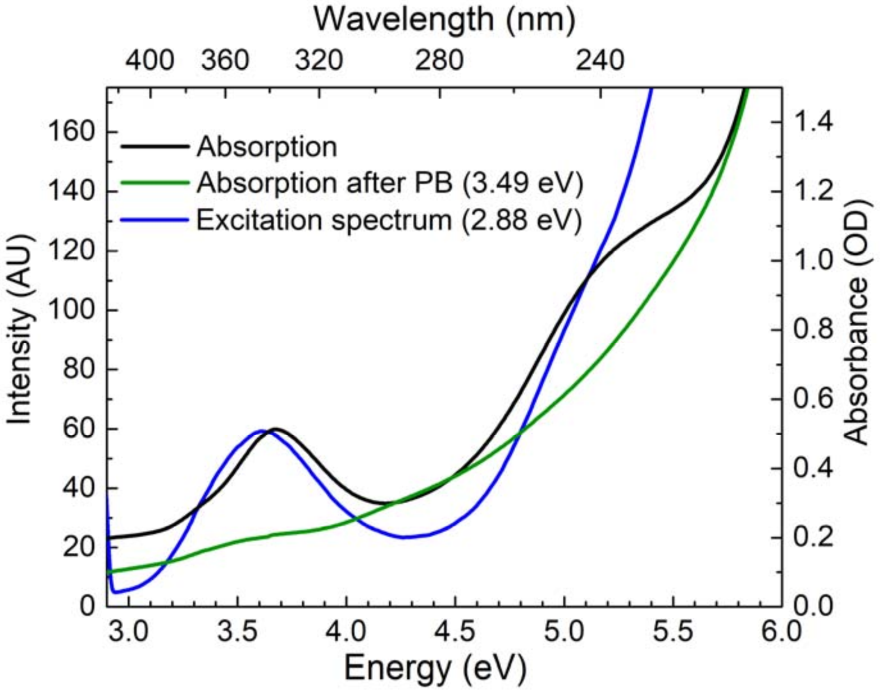

**Figure S4:** Optical absorption before/after photobleaching (the same as in Figure 1 of the main paper), compared to the photoluminescence excitation spectrum (PLE) of the blue emission band. PB causes the disappearance of the two absorption bands (3.7eV and 5.3 eV, compare black and green trace) of the molecular chromophores, leaving the characteristically unstructured absorption tail due to core states. The PLE matches very well the lowest absorption transition at 3.7 eV, but does not display a clear absorption band at 5.3 eV. In contrast, the high-energy shape of the PLE is much closer to the “core absorption”, suggesting that deep-UV excitation of the molecular chromophore preferentially occurs by core excitation followed by energy transfer to the surface state.

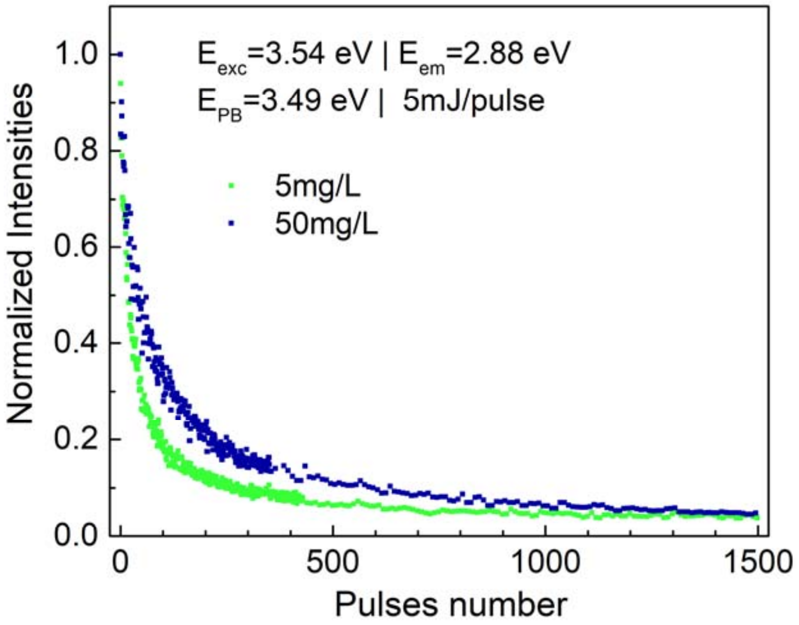

**Figure S5**: Fluorescence PB kinetics observed when UV irradiating two solution of CDs at different concentrations: 50 mg/L (blue dots) and 5 mg/L (green dots).