**Supporting Information**

# Two-Photon Absorption Enhancement for Organic Acceptor Molecules with QD Antennas

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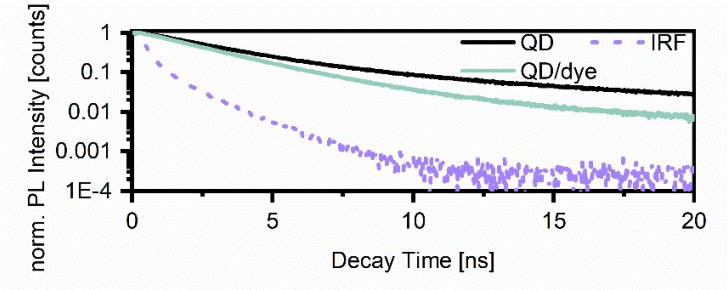



*Fig. S 1 Fluorescence lifetime decay of the pure CdS/ZnS QDs (black) and the QD/coumarin 343 hybrid system (green) recorded after photoexcitation in the UV and the instrumental response function (IRF) recorded using an aqueous $TiO_2$ suspension (orange).*

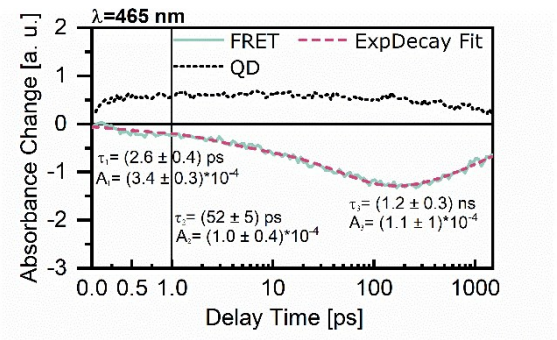
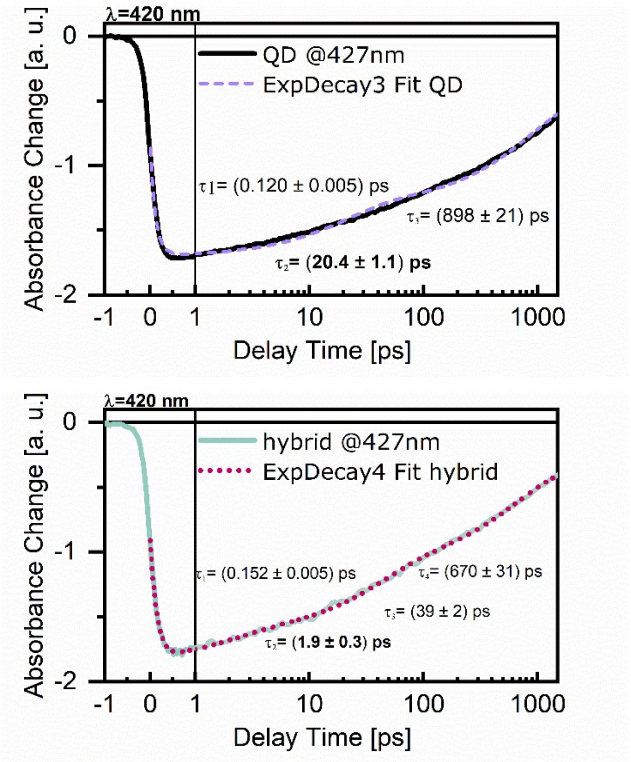



*Fig. S 2 Single transients of pure QDs (black dotted), hybrids (green) at 465 nm and exponential fit of the FRET transient (dotted pink line). The fit parameters are also indicated below the transient.*




$$\tau_{2\,QD} = 20.4\,ns \rightarrow k_{QD} = 49{,}02\,ns^{-1}$$

$$\tau_{2\,hybrid} = 1{,}92\,ns \rightarrow k_{hybrid} = 520{,}83\,ns^{-1}$$

$$E_1 = 1 - \frac{49.02\,ns^{-1}}{520{,}83\,ns^{-1}} = 90.59\,\%$$

*Fig. S 3 Single transients of pure QDs and hybrids at 420 nm. Here the SE dynamics is the dominantly contributes to the transient absorption signal. The exponential fits of the transients are shown as dashed or dotted lines, the fit parameters are indicated in the graphs. Calculation of the energy transfer efficiency is given at the bottom.*

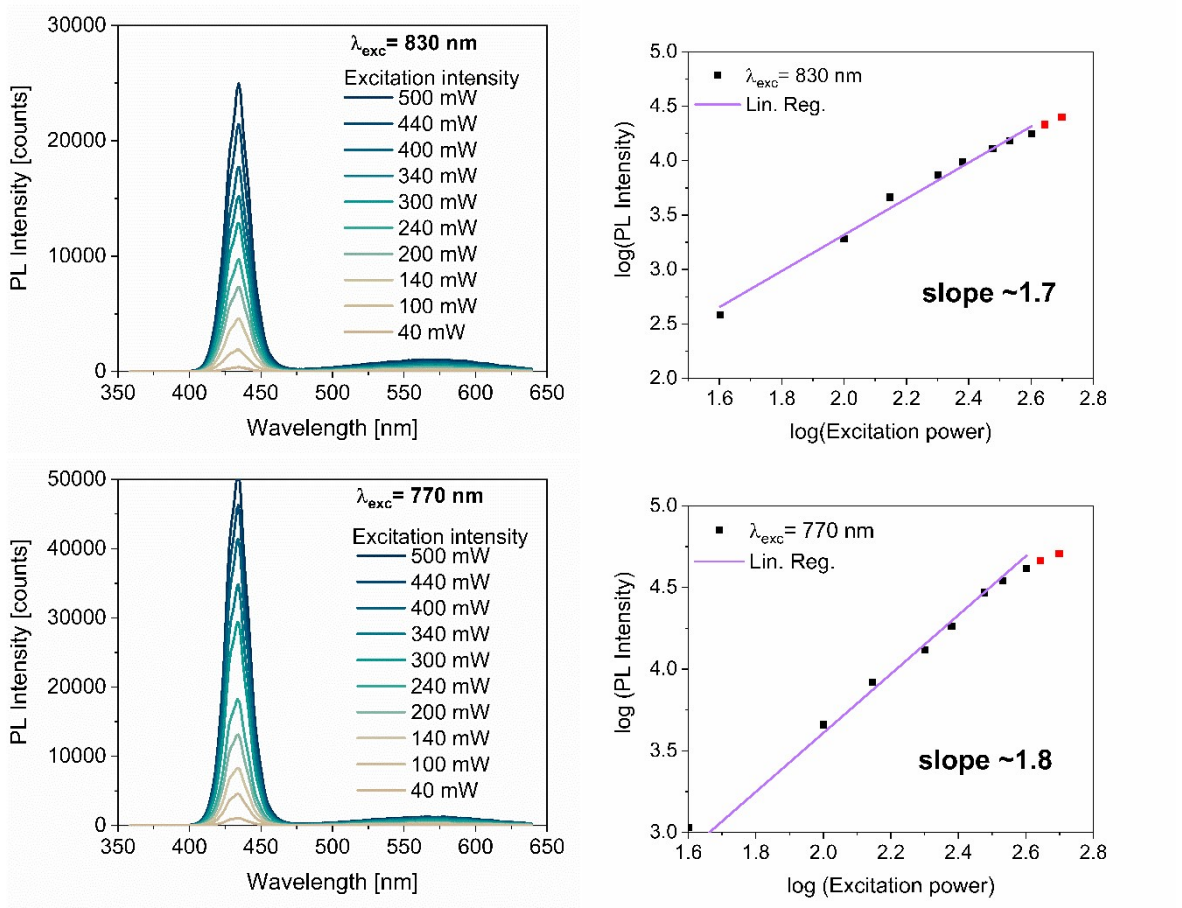



*Fig. S 4 Power dependence of two-photon induced fluorescence of CdS/ZnS QDs at (a) 830 nm and (b) 770 nm excitation. The additional logarithmic plots of the emission maximum against the excitation power illustrate the (near) quadratic dependence of the 2PA of the QDs.*