Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Laser-controlled projection of quantum dot dipoles using metal-oxide plasmonic metastructures: keeping spin polarization memory

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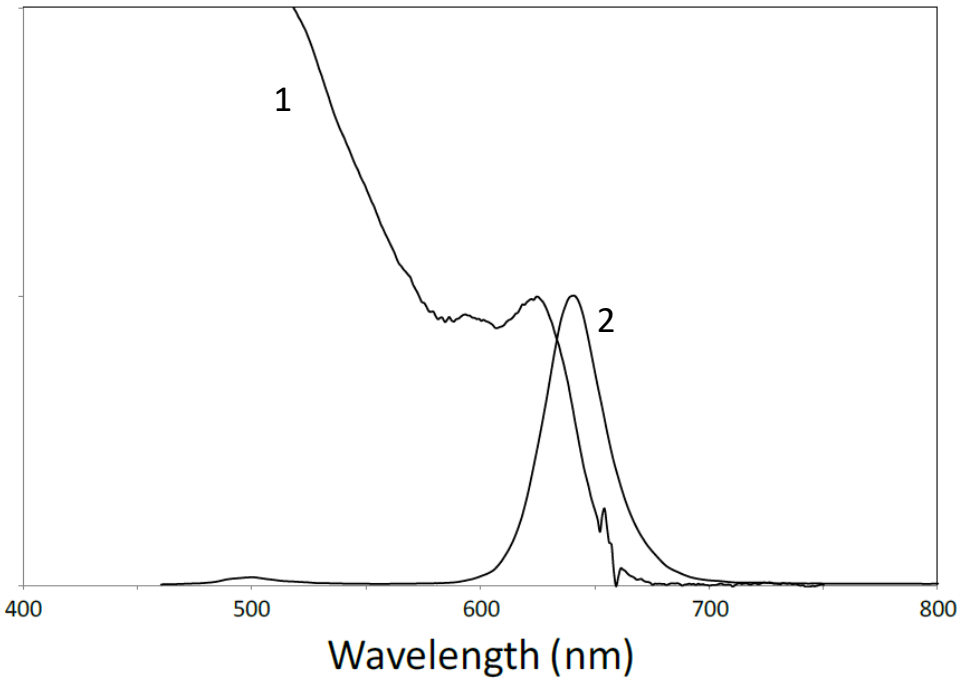

Fig. S1. Absorption (line 1) and emission spectra (line 2) of QDs as provided by NNCrystal US Corporation (NN Labs LLC).

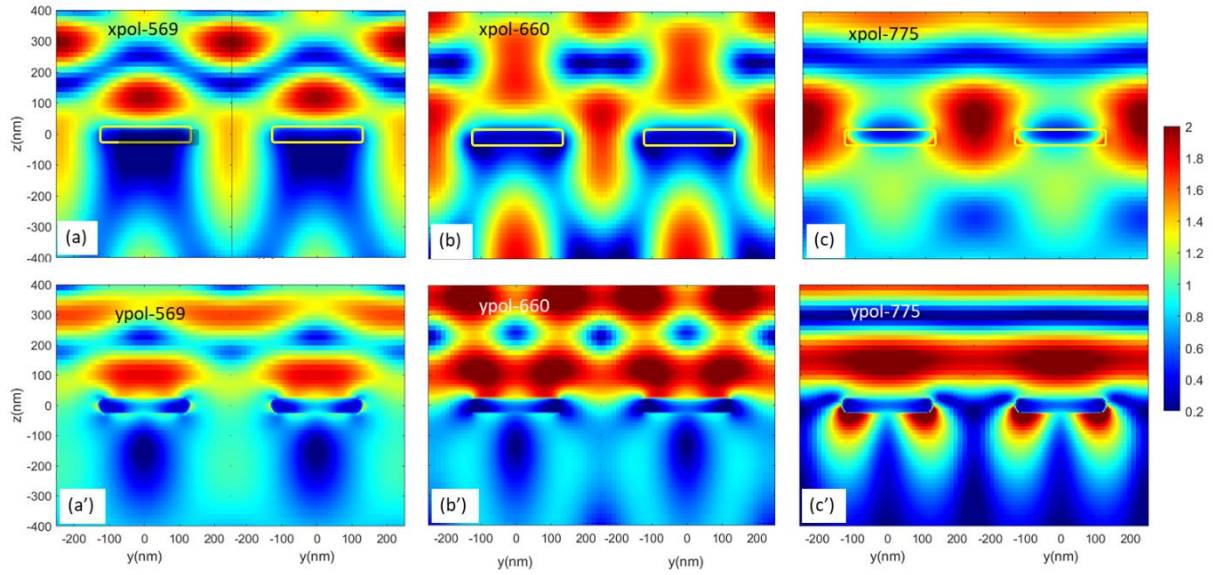

Fig. S2. Mode field enhancement profiles for the structure shown in Fig.6c, corresponding to sample 3, in the y-z plane at wavelengths 569, 660, and 775 nm for $\theta_i=0^o$ (a-c) and $\theta_i=90^o$ (a'-c'). Here the refractive index of the superstrate is considered to be 1.33.

To further analyze the dynamics of excitons in the presence of MOPM in sample 3, we carried out spectrally resolved lifetime measurements. For this the emission of the QDs was first passed through a monochromator and then detected by a single photon photomultiplier detector. Fig. S3(a) shows the results of the measurements in the range of 610-665 nm. Therefore, the measurements were about at 30nm around the emission peak of the QDs (Fig. S3(b), red solid line). Fig. S3(b) shows the contour map of for equal amount of count per second (CPS) seen in Fig. S3(a). If we compare these contours with emission spectrum of the QD (solid line), one notes some differences. These can be associated with the fact that for TCPSC the excitation laser was a 30-ps pulsed laser at 450 nm. These results can be more revealing if we normalize the CPS at different wavelengths to unity, as shown in Fig. S3(c). Under this condition the contour map (Fig. S3(d)) demonstrates the relative differences between the decay of QDs at different wavelengths. The color bar in this figure show the normalized CPS. The results show that at longer wavelength the decay of QDs of QDs is slower, while for shorter wavelength it faster.

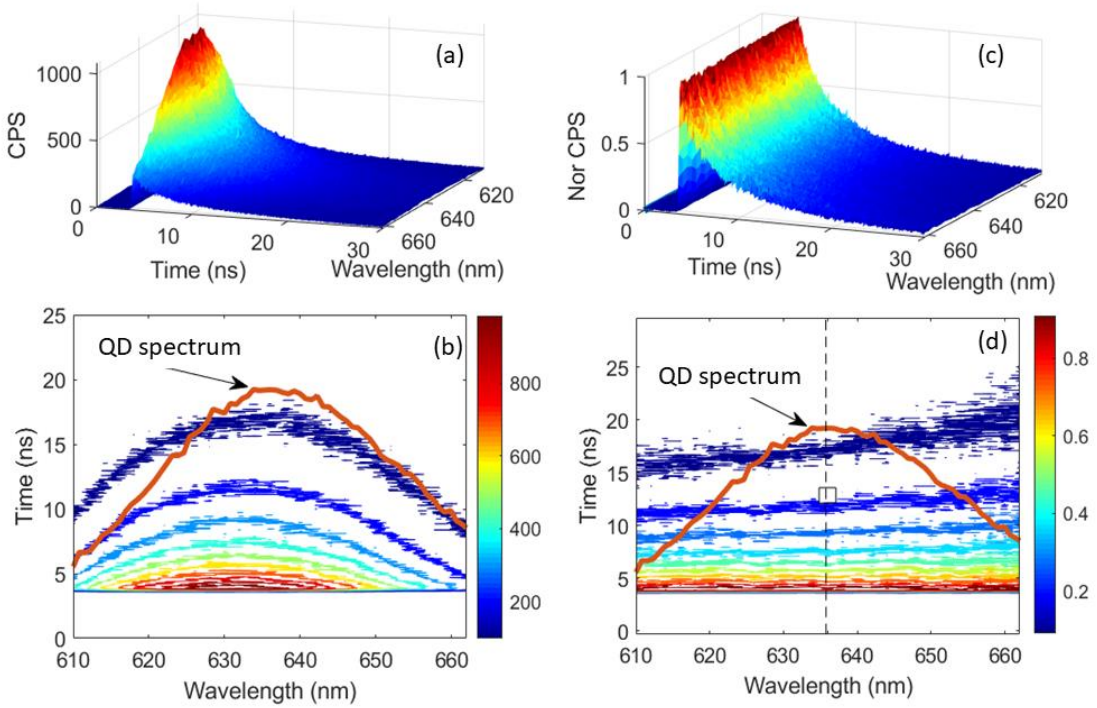

Fig. S3. Wavelength-resolved decay of QDs on sample 3 (a) and its contour (b). (e) the normalized decay shown in (a), and (d) presents its contour. CPS refers to counts per second. The thick red lines in (b) and (d) show the emission spectrum of the QDs in the wavelength range shown in these figures.