Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.


# Supporting information

# The spectral relaxation dynamics and the molecular crowding effect of the silver nanoclusters synthesized in the polymer scaffold

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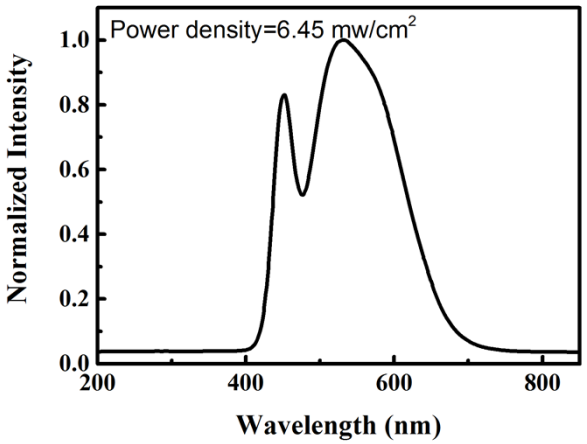


Figure $S_1$: The power density and the spectra of the LED lamps used for synthesizing the PMAA-AgNCs

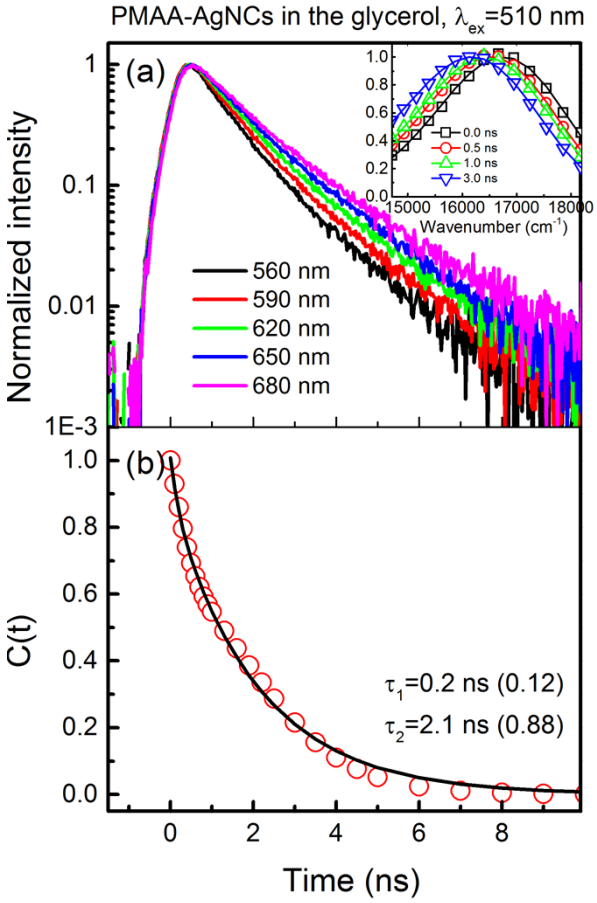


Figure $S_2$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs in the glycerol solution. The excitation wavelength is fixed at 510 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

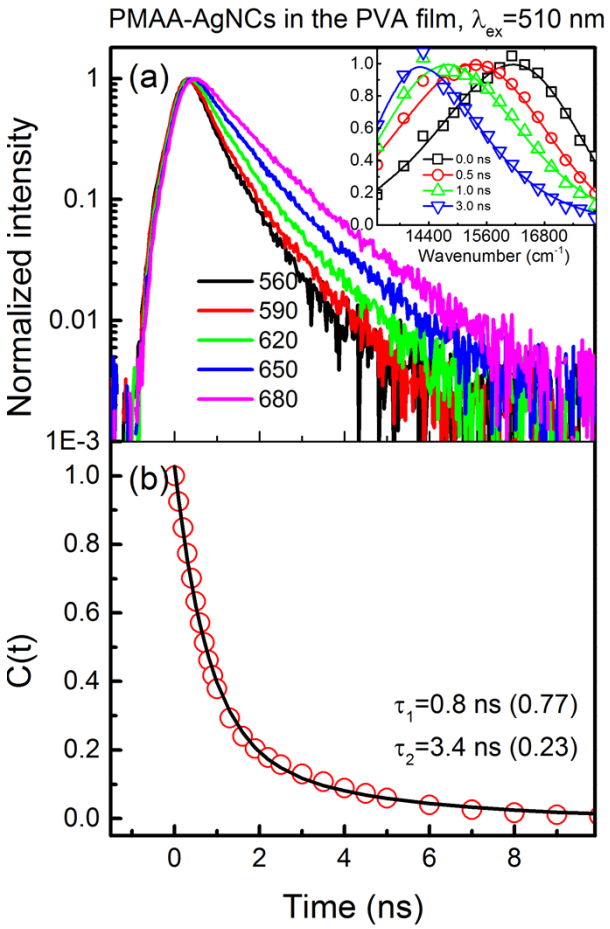


Figure $S_3$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs embedded in the PVA film. The excitation wavelength is fixed at 510 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

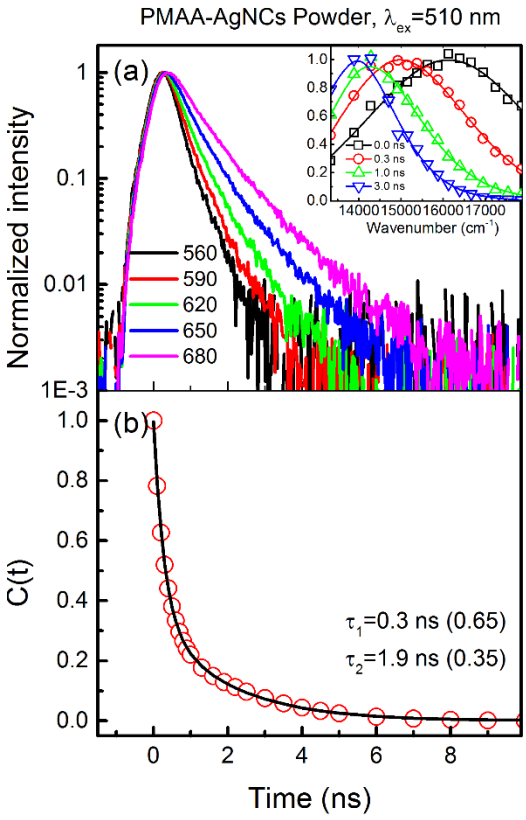


Figure $S_4$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs solid powder. The excitation wavelength is fixed at 510 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

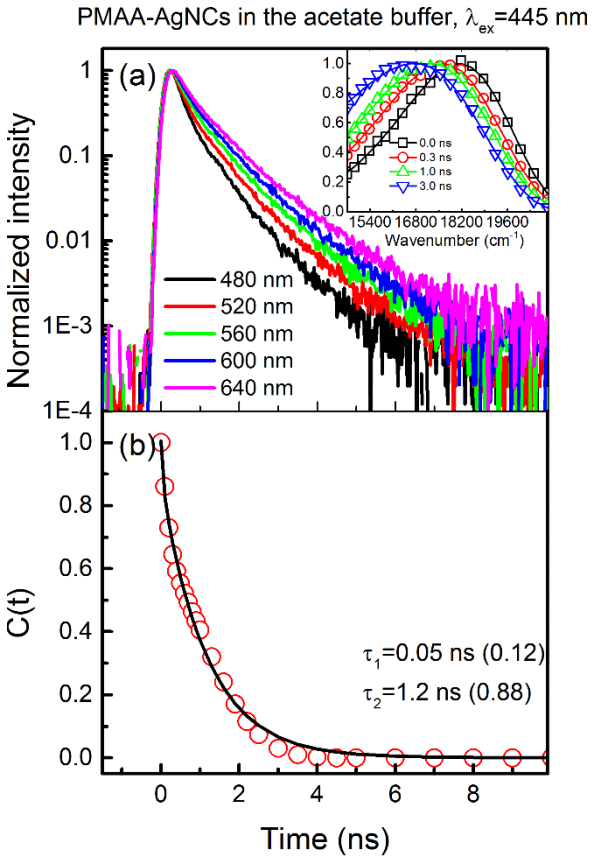


Figure $S_5$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs in the acetate buffer. The excitation wavelength is fixed at 445 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

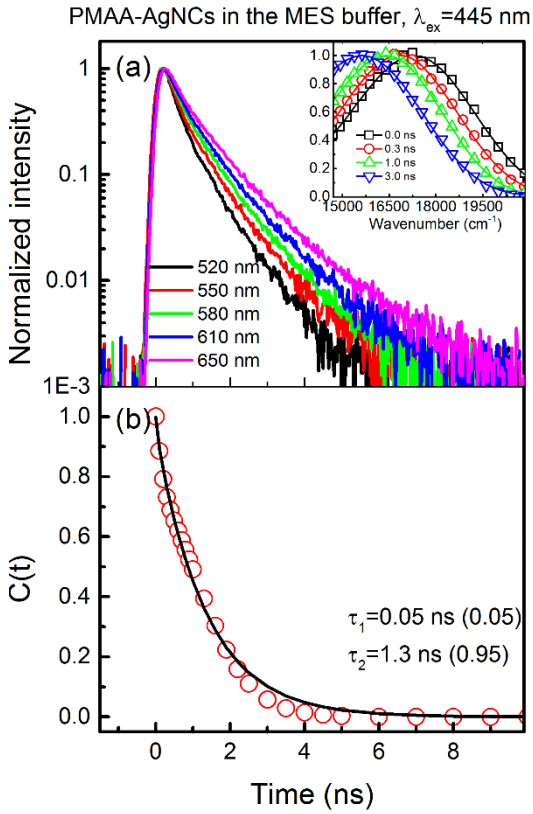


Figure $S_6$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs in the MES buffer. The excitation wavelength is fixed at 445 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

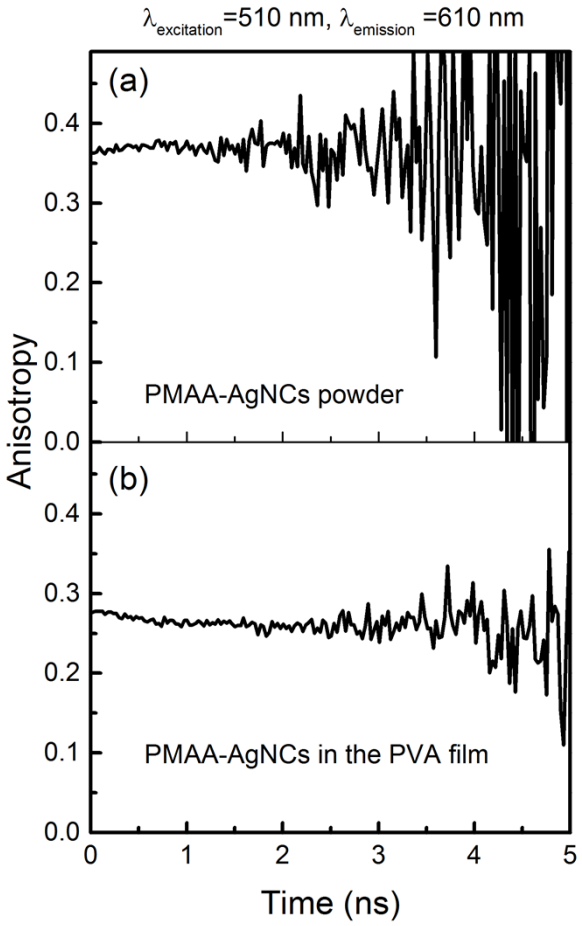


Figure $S_7$: The anisotropy decay dynamics of PMAA-AgNCs (a) solid powder (b) embedded in the PVA film.

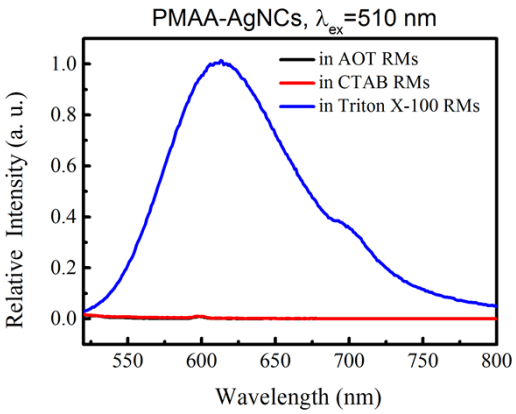


Figure $S_8$: The relative fluorescence intensity of the PMAA-AgNCs in AOT, CTAB and Triton X-100 RMs

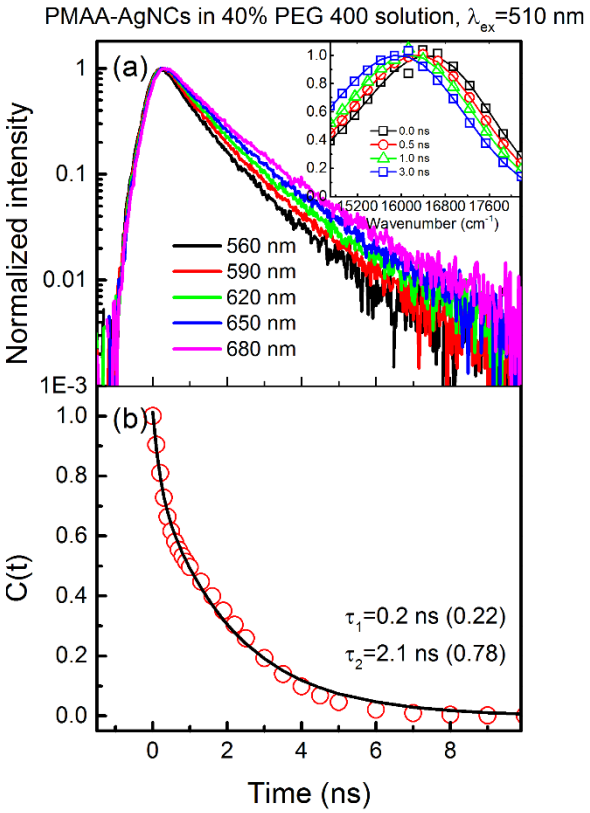


Figure $S_9$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs in 40% PEG 400 solution. The excitation wavelength is fixed at 510 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

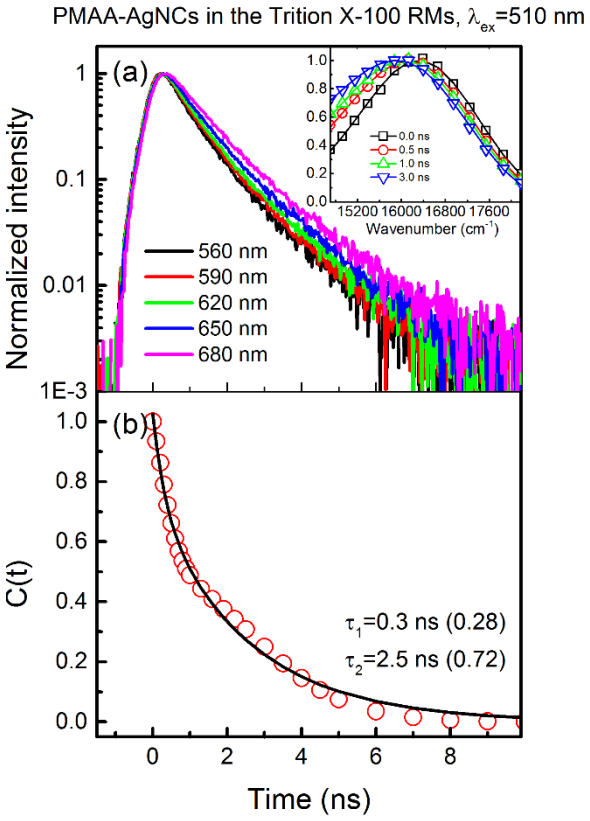


Figure $S_{10}$: The (a) fluorescence decay dynamics and the (b) spectral relaxation dynamics of the PMAA-AgNCs in the Triton X-100 RMs. The excitation wavelength is fixed at 510 nm, and the reconstructed time-resolved emission spectra of the PMAA-AgNCs are indicated in the inset.

Table $S_1$: The fitting parameters of the spectral relaxation dynamics of PMAA-AgNCs in various environments

| $\lambda_{excitation}$ | 510 nm | | | | | | | 445 nm | |
|---|---|---|---|---|---|---|---|---|---|
| | MES buffer | Acetate buffer | Glycerol | 40% PEG 400 | TX-100 RMs | PVA film | powder | MES buffer | Acetate buffer |
| Concentration/M | $3.8\times10^{-4}$ | $3.8\times10^{-4}$ | $3.8\times10^{-4}$ | $3.8\times10^{-4}$ | $3.8\times10^{-4}$ | N.A. | N.A. | $3.8\times10^{-4}$ | $3.8\times10^{-4}$ |
| $\nu(0)/cm^{-1}$ | 16196 | 16642 | 16749 | 16473 | 16323 | 16160 | 16128 | 17303 | 18123 |
| $\nu(\infty)/cm^{-1}$ | 15592 | 16323 | 16025 | 15806 | 15765 | 13900 | 13712 | 15527 | 16702 |
| $^{a}\Delta\nu/cm^{-1}$ | 604 | 319 | 724 | 667 | 558 | 2260 | 2416 | 1776 | 1421 |
| $a_1$ | 1.00 | 0.24 | 0.12 | 0.22 | 0.28 | 0.77 | 0.65 | 0.05 | 0.12 |
| $a_2$ | N.A. | 0.76 | 0.88 | 0.78 | 0.72 | 0.23 | 0.35 | 0.95 | 0.88 |
| $\tau_1$/ns | 1.4 | 0.27 | 0.2 | 0.2 | 0.3 | 0.77 | 0.28 | 0.05 | 0.05 |
| $\tau_2$/ns | N.A. | 1.5 | 2.1 | 2.1 | 2.5 | 3.4 | 1.9 | 1.3 | 1.2 |
| $^{b}\tau_{average}$/ns | 1.4 | 1.2 | 1.9 | 1.7 | 1.9 | 1.4 | 0.8 | 1.2 | 1.1 |

$^{a}\Delta\nu=\nu(0)-\nu(\infty)$

$^{b}\tau_{average}=(a_2\times\tau_1+ a_2\times\tau_2)/(a_{1+}a_2)$