

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

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Supporting information

Assembling semiconductor quantum dots in hierarchical photonic cellulose nanocrystal films: circularly polarized luminescent nanomaterials as optical coding labels

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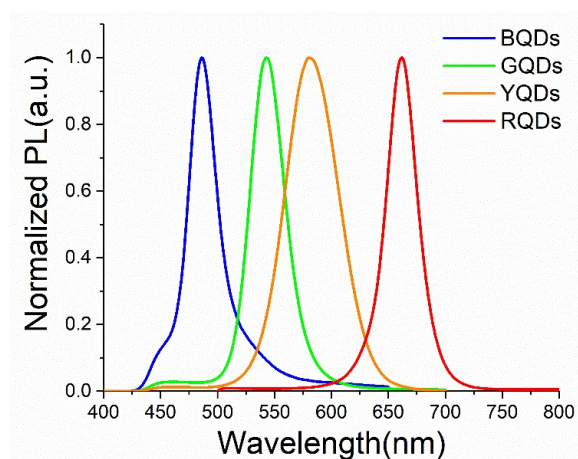


Figure S1 Normalized fluorescence spectra of the ZnS/CdSe QDs dispersion with tunable emission wavelengths.

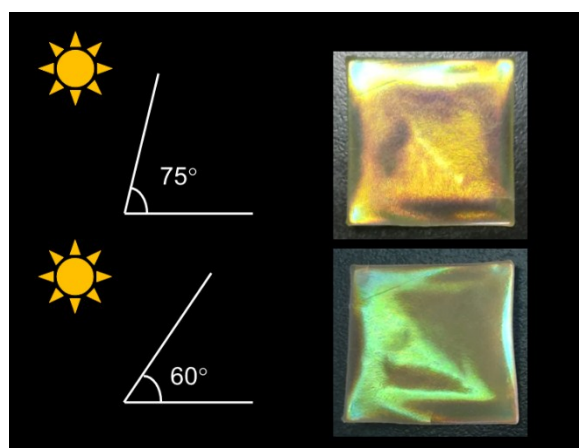


Figure S2 Photographs of photonic film(G2-GQD) viewed under different angels.

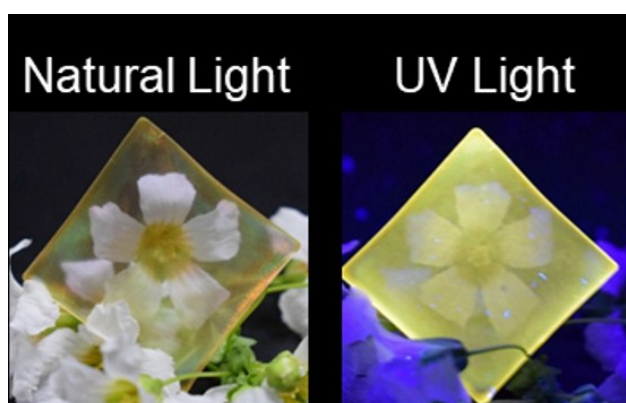


Figure S3 Photographs of photonic film(G2-YQD) taken under natural light and UV light on a flower.

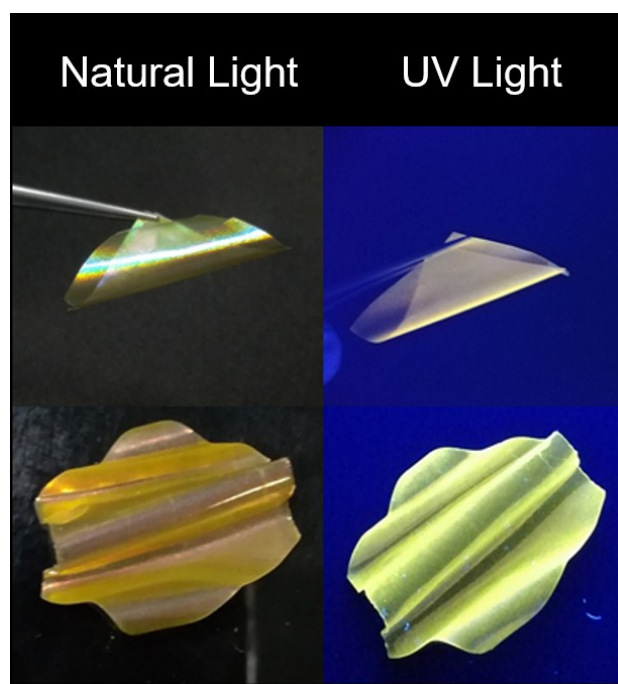


Figure S4 Photographs of photonic film(G2-YQD) showing the flexibility taken under natural light and UV light.

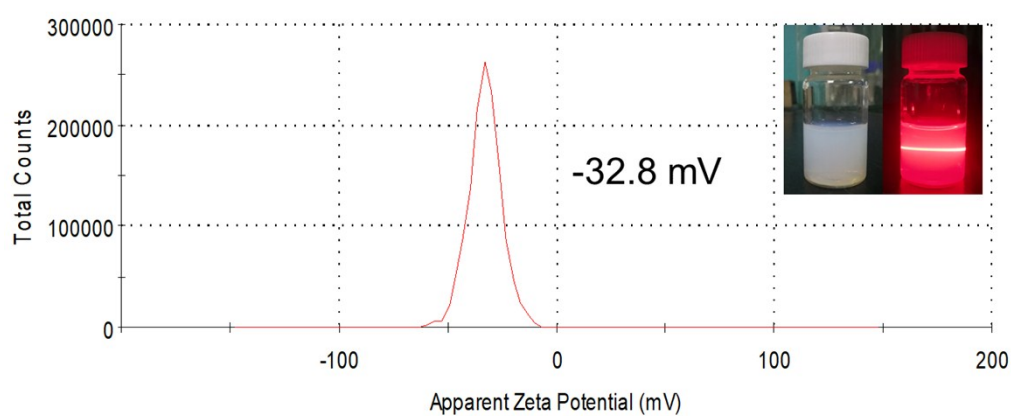


Figure S5 Zeta potential distribution CNCs suspension. The inset is the CNCs suspension taken under natural light and a red laser.

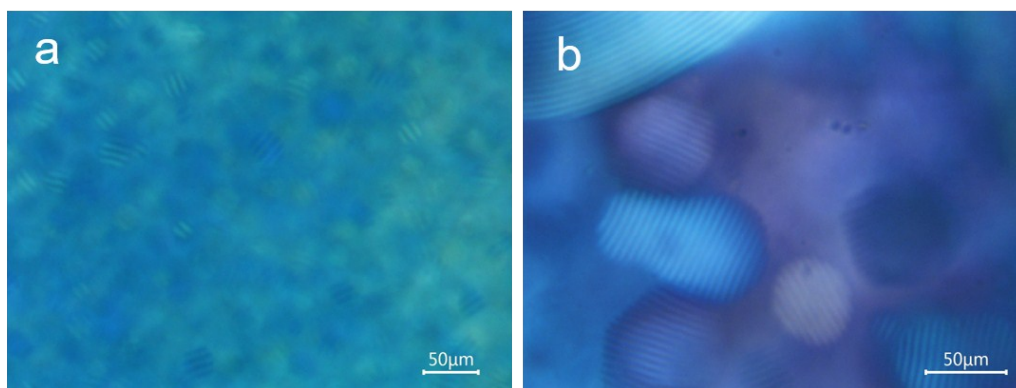


Figure S6 POM image of concentrated composite suspension showing: (a) the formation of small anisotropic tactoids and (b) the fusing of tactoids.

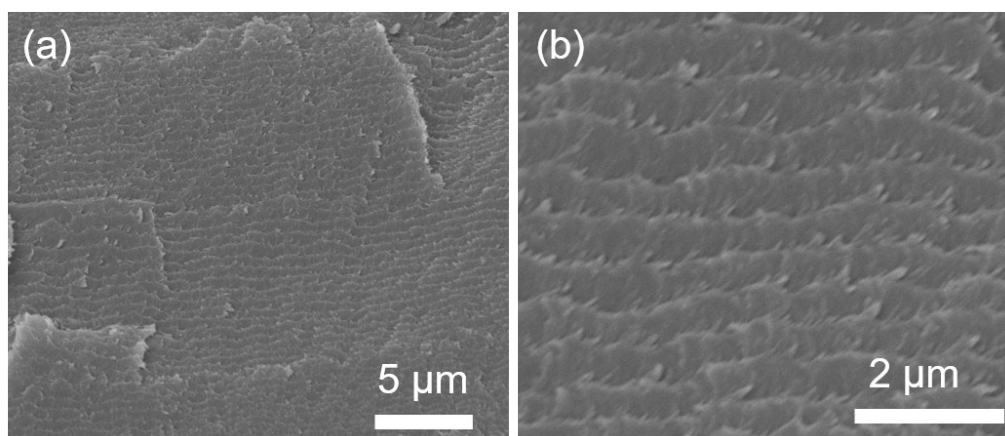


Figure S7 Cross-sectional SEM image of CNC-GQD photonic film: (a) Low magnification SEM image; (b) High magnification SEM image.

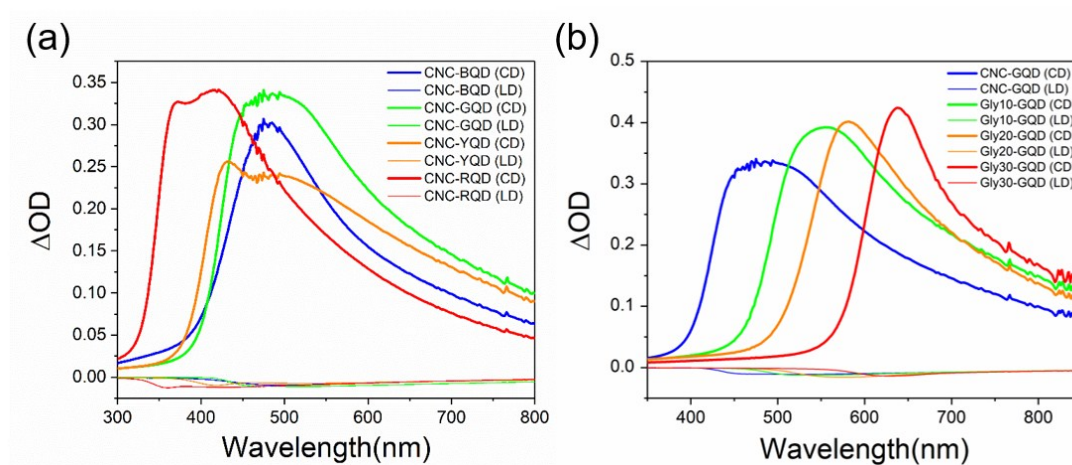


Figure S8 (a) CD and LD spectrum of CNC photonic films containing different types of QDs. (b) CD and LD spectrum of photonic films with different glycerol content. The

measured LD spectra are unified as the same unit (mdeg) with CD spectra according to the below formula:¹ 1 mdeg = 3.05×10^{-5} OD.

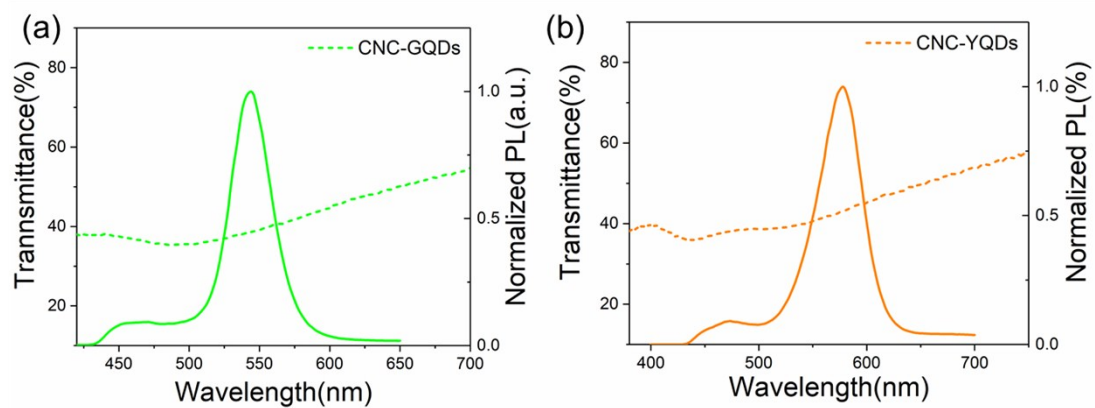


Figure S9 (a) Left vertical axis is transmission spectra of CNC-GQDs, right vertical axis is the normalized PL spectra of CNC-GQDs. (b) Left vertical axis is transmission spectra of CNC-YQDs, right vertical axis is the normalized PL spectra of CNC-YQDs.

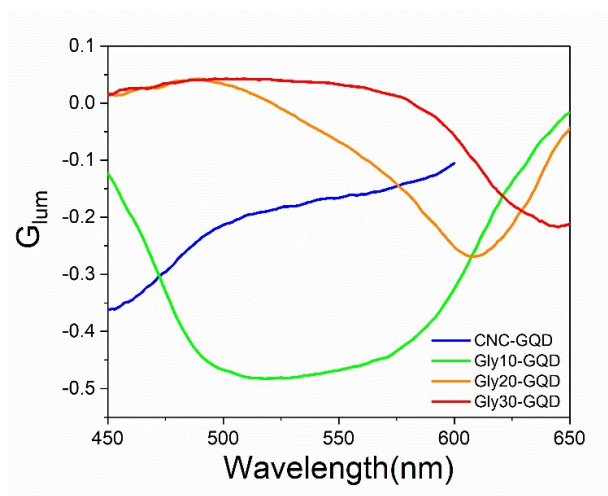


Figure S10 G_{lum} curves of GQD photonic films with tunable PBGs.

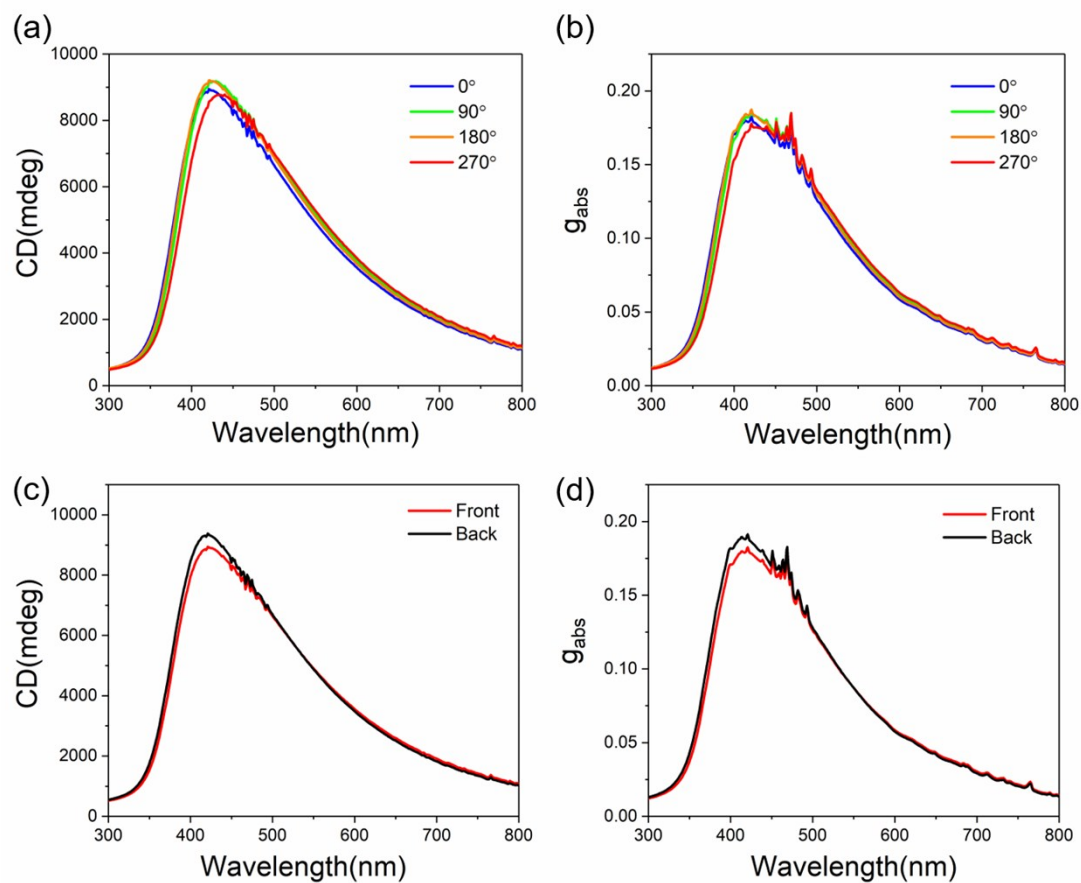


Figure S11 (a) CD spectra of CNC-GQD film (55 μm) using different rotation angles. (b) Corresponding g_{abs} . (c) The “front-and-back” CD spectra of CNC-GQD film (55 μm). (d) Corresponding g_{abs} .

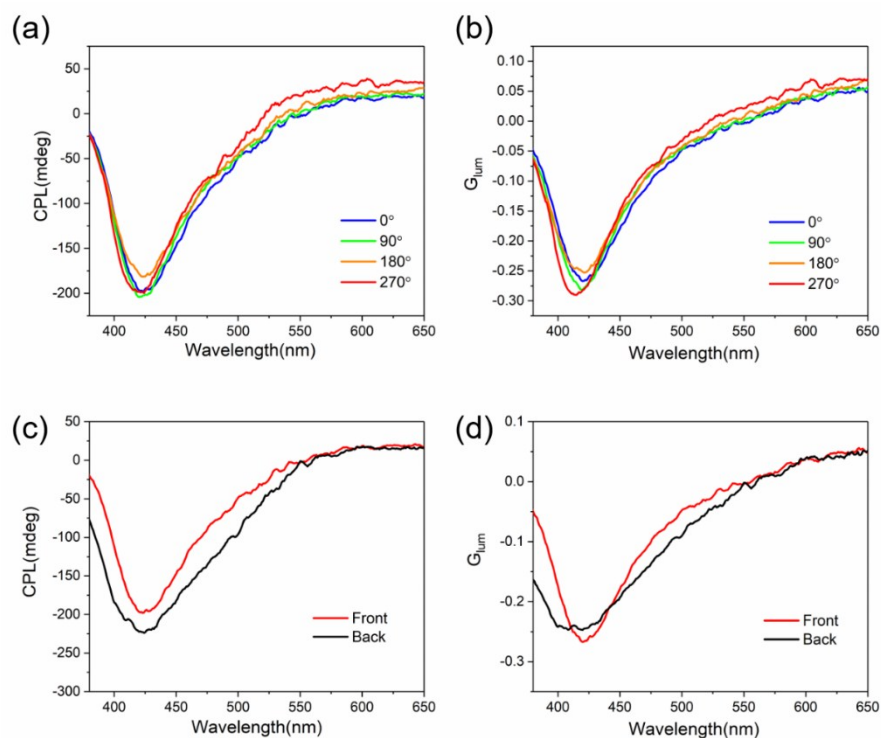


Figure S12 (a) CPL spectra of CNC-GQD film (55μm) using different rotation angles. (b) Corresponding g_{lum} . (c) The “front-and-back” CPL spectra of CNC-GQD film(55μm). (d) Corresponding g_{lum} .

Table S1 Optical properties of GQD photonic films with tunable PBGs.

Sample	$\lambda_{em}(nm)$	$\lambda_{max}(PBG(nm))$	maximum g_{lum}
CNC-GQD	529	487	-0.36
Gly10-GQD	538	544	-0.48
Gly20-GQD	533	590	-0.26
Gly30-GQD	527	646	-0.21

Reference

1. Y. Rong, P. Chen and M. Liu. Chem. Commun., 2013, **49**, 10498-10500.