

## Supporting Information

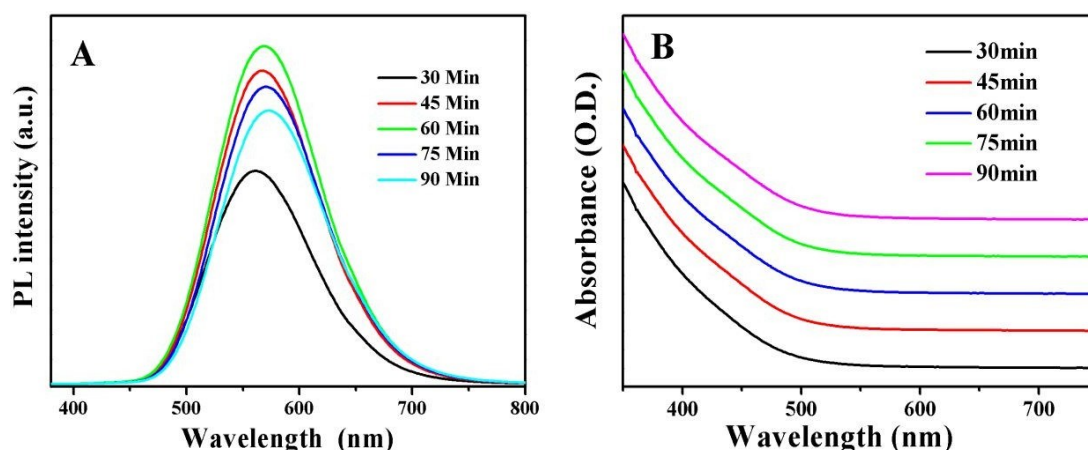
### Flexible translucent Chitosan-Glycerin/QDs Nanocomposites Glue for Anti-Counterfeiting Films with Strong Adhesion and Stability

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Guangyu Chen, Xinyu, Lai

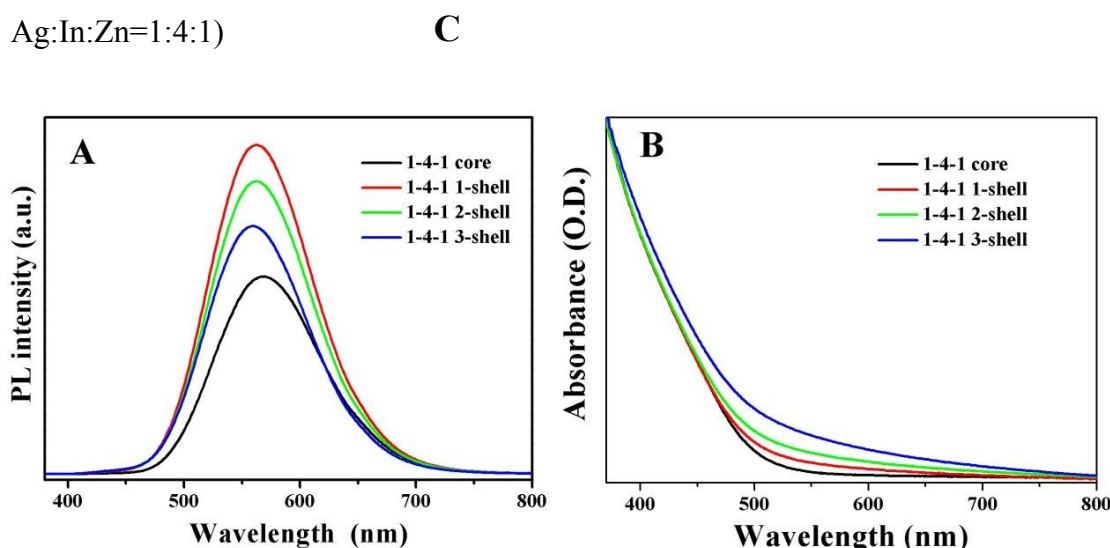
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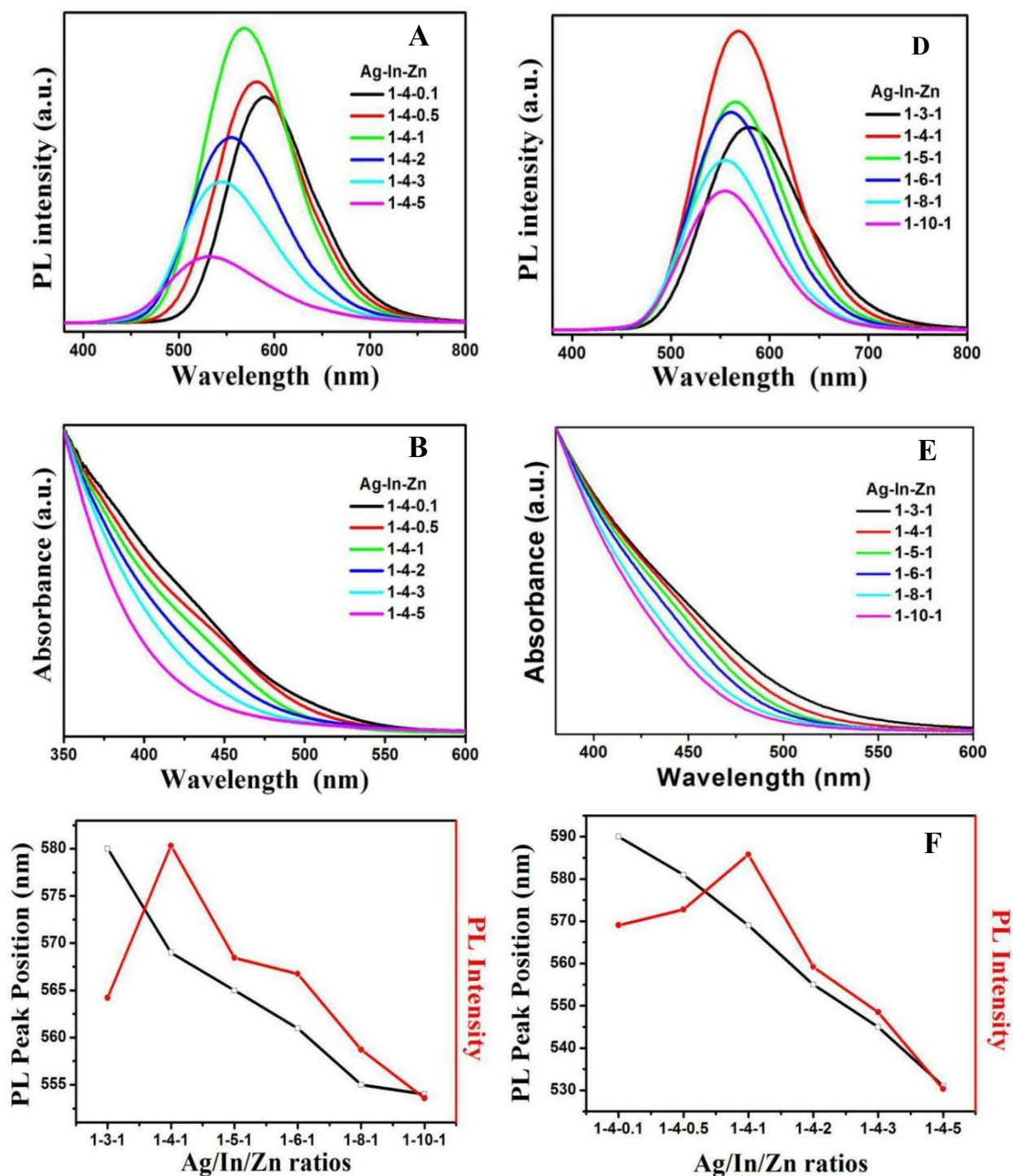
Email: [yanyanchen@hfut.edu.cn](mailto:yanyanchen@hfut.edu.cn); [shenjieli@hfut.edu.cn](mailto:shenjieli@hfut.edu.cn)



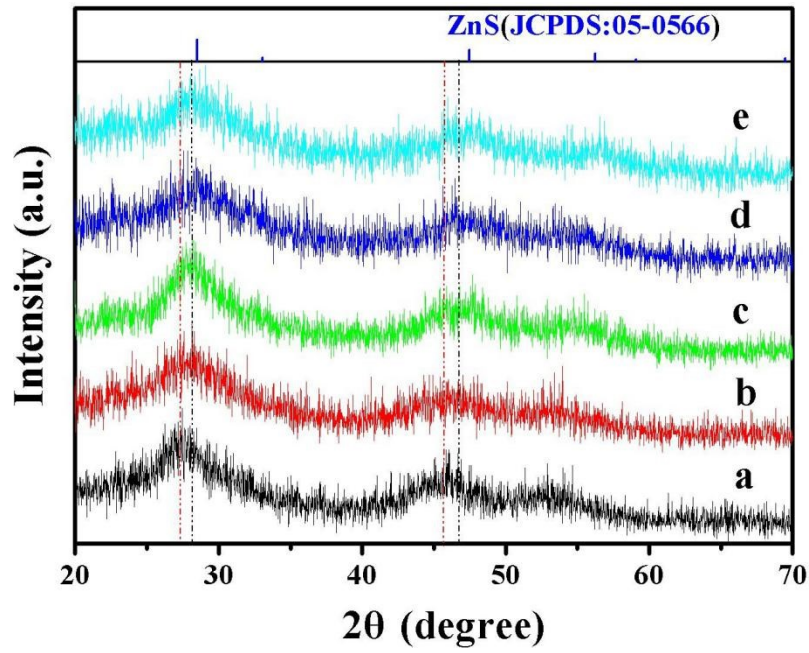
**Figure S1** The fluorescence emission spectra (A) and UV-vis absorption spectra (B) of AIZS core QDs obtained under different reaction time (the start ratios of Ag:In:Zn=1:4:1)



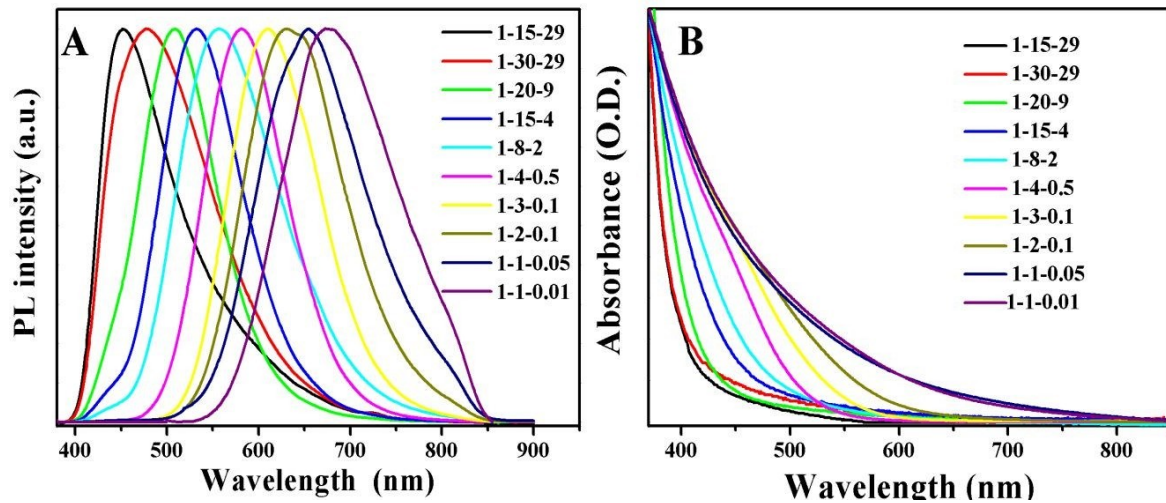
**Figure S2** The fluorescence emission spectra (A) and UV-vis absorption spectra (B) of AIZS/ZnS core/shell QDs obtained under different shells. (the start ratios of Ag:In:Zn=1:4:1)



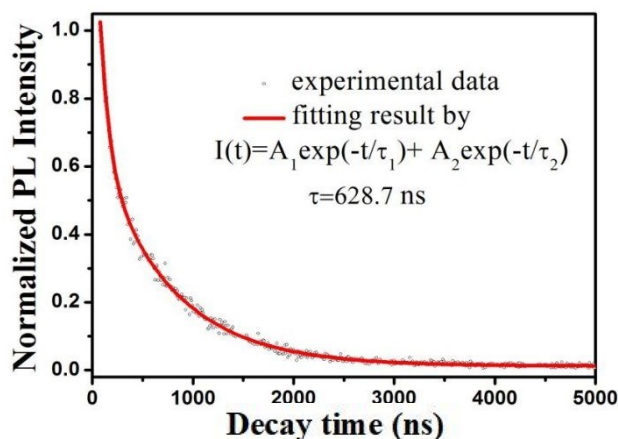
**Figure S3** The PL spectra, UV-vis absorption and corresponding line chart of PL peak position and the PL intensity of AIZS core QDs prepared with the start ratios of Ag:In:Zn=1:4:x (x=0.1, 0.5, 1, 2, 3, 5) (A, B,C) and Ag:In:Zn=1:4:x (x=0.1, 0.5, 1, 2, 3, 5) (D, E, F).



**Figure S4** XRD patterns of different AIZS core NCs: the ratios of Ag-In-Zn in pattern a to e is 1:4:0.1, 1:4:0.5, 1:4:1, 1:4:2, 1:4:4, respectively.



**Figure S5** The fluorescence emission spectra (A) and UV-vis absorption spectra (B) of AIZS core QDs obtained under different start ratios.



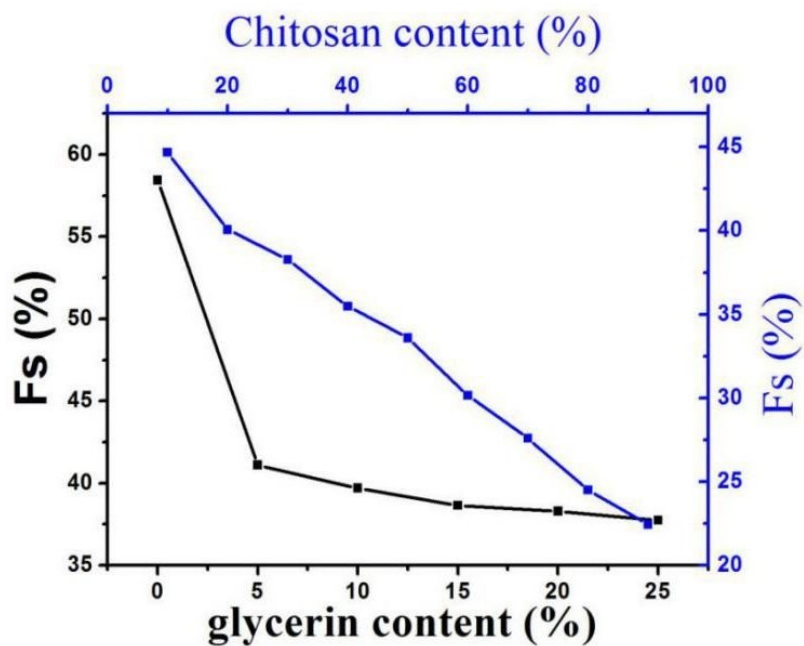
**Figure S6** Fluorescence decay curves of AIZS/ZnS core/shell QDs. (Ag/In/Zn=1/4/1)

**Table S1** Effect of gelatin content on transmittance of composite film. (*G* refers to Gelatin and *Ch* refers to Chitosan)

Samples	Light transmission at different wavelengths (%)								Thickness (mm)	Transparency value
	200	280	350	400	500	600	700	800		
90G:10Ch	32.0	27.7	36.2	63.2	86.3	87.6	88.6	88.9	0.118	0.4872
80G:20Ch	35.8	31.1	42.2	66.8	88.1	89.3	90.2	90.9	0.100	0.4915
70G:30Ch	31.9	27.6	42.5	68.6	88.6	89.7	90.9	91.9	0.095	0.4969
60G:40Ch	29.9	25.8	38.9	66.2	88.2	89.7	91.1	91.8	0.094	0.5022
50G:50Ch	38.8	33.8	48.3	69.9	88.9	90.2	91.0	91.8	0.088	0.5090
40G:60Ch	62.5	55.6	66.4	70.2	87.4	88.9	89.8	90.2	0.075	0.6813
30G:70Ch	32.7	29.9	51.4	68.0	83.7	85.9	87.9	89.5	0.051	1.0202
20G:80Ch	31.5	30.1	52.9	67.6	83.9	86.5	88.4	89.8	0.057	1.105
10G:90Ch	42.4	43.3	59.7	66.2	83.3	85.9	88.0	89.7	0.055	1.2001

**Table S2** Effect of glycerine content on the transmittance of composite films. (Note: glycerine content=glycerine/(chitosan+gelatin); Chitosan/gelatin=1/1.)

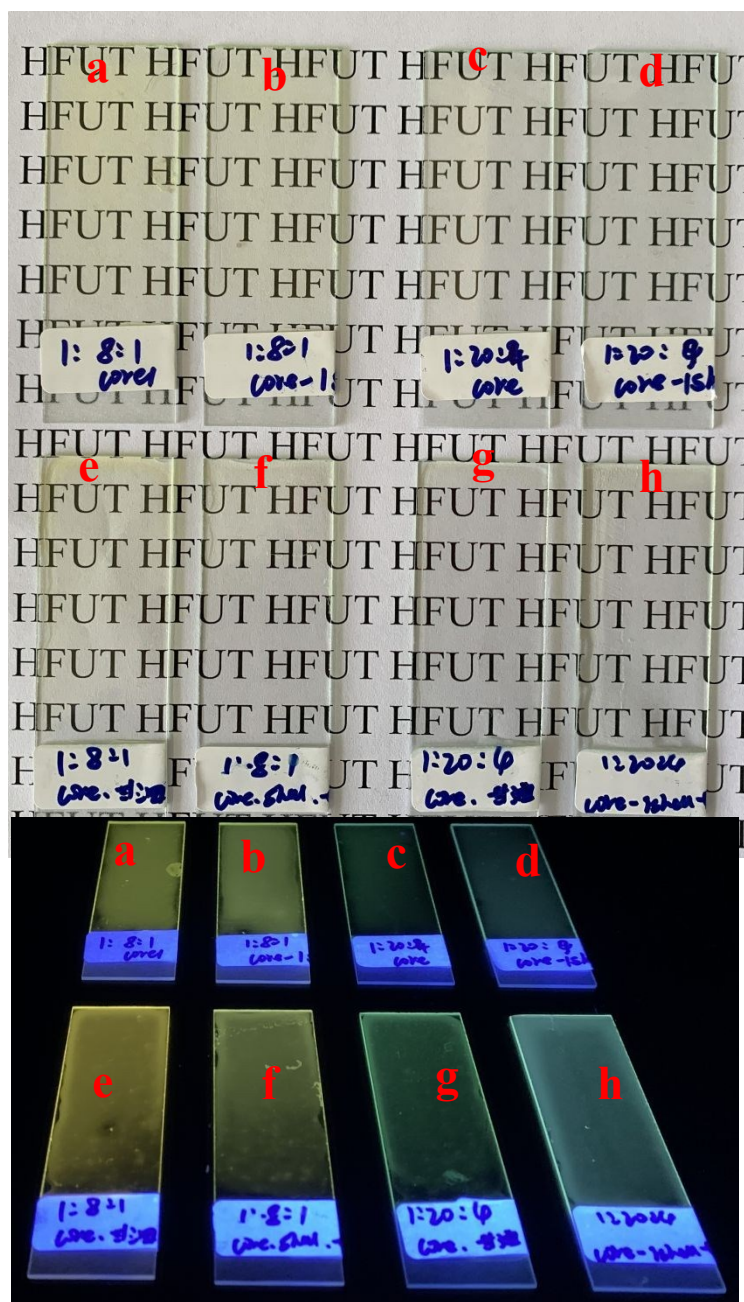
glycerine content	Light transmission at different wavelengths (%)						Thickness (mm)	Transparency value
	350	400	500	600	700	800		
5%	46.3	72.0	88.7	89.9	90.9	91.5	0.0897	0.5155
10%	43.4	71.5	88.1	89.0	89.3	89.6	0.0893	0.5667
15%	45.0	72.1	89.2	90.3	90.9	91.1	0.0943	0.4699
20%	47.8	73.8	89.5	90.6	91.1	91.1	0.0710	0.6038
25%	45.1	71.6	88.9	90.2	90.7	91.1	0.0947	0.4730
30%	47.9	73.4	89.3	90.2	90.6	90.7	0.0850	0.5270



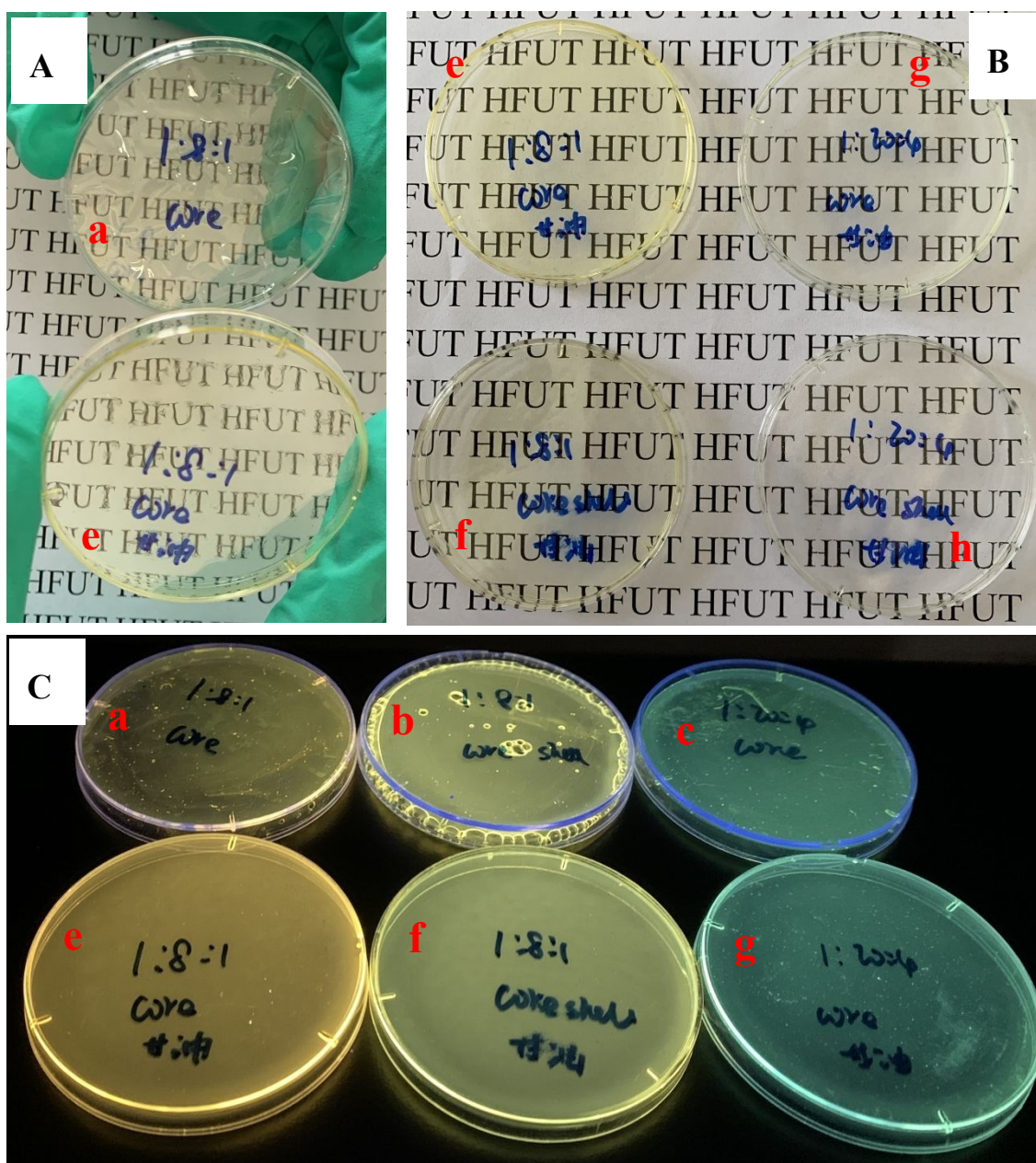
**Figure S7** The solubility of films obtained with different chitosan and glycerin content.

**Table S3** The specific composition of the composite films used in Figure S8, S9 and S10.

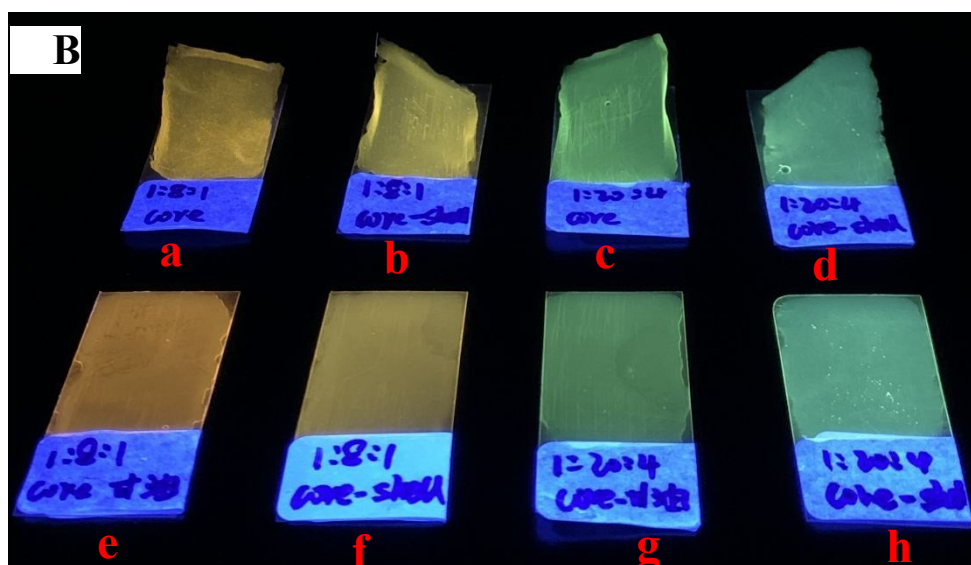
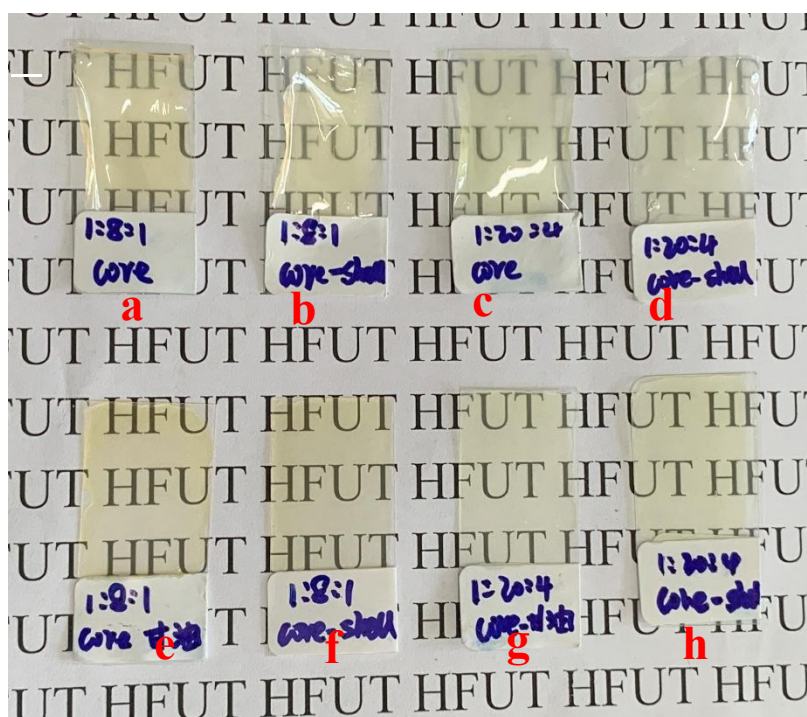
<b>Film Code</b>	<b>NCs</b>	<b>Ratios of Ag-In-Zn</b>	<b>Gelatin</b>	<b>Chitosan</b>	<b>Glycerin</b>
<b>a</b>	Ag-In-Zn-S core NCs	1/8/1	√	×	×
<b>b</b>	Ag-In-Zn-S/ZnS core/shell NCs	1/8/1	√	×	×
<b>c</b>	Ag-In-Zn-S core NCs	1/20/4	√	×	×
<b>d</b>	Ag-In-Zn-S/ZnS core/shell NCs	1/20/4	√	×	×
<b>e</b>	Ag-In-Zn-S core NCs	1/8/1	√	√	√
<b>f</b>	Ag-In-Zn-S/ZnS core/shell NCs	1/8/1	√	√	√
<b>g</b>	Ag-In-Zn-S core NCs	1/20/4	√	√	√
<b>h</b>	Ag-In-Zn-S/ZnS core/shell NCs	1/20/4	√	√	√



**Figure S8** Digital photographs of G-QDs TFs (a, b, c and d) and GCG-QDs TFs (e, f, g and h) on glass slides after drying in air taken under daylight (up) and UV-light (down). The specific composition of the composite membrane is shown in **Table S3**.

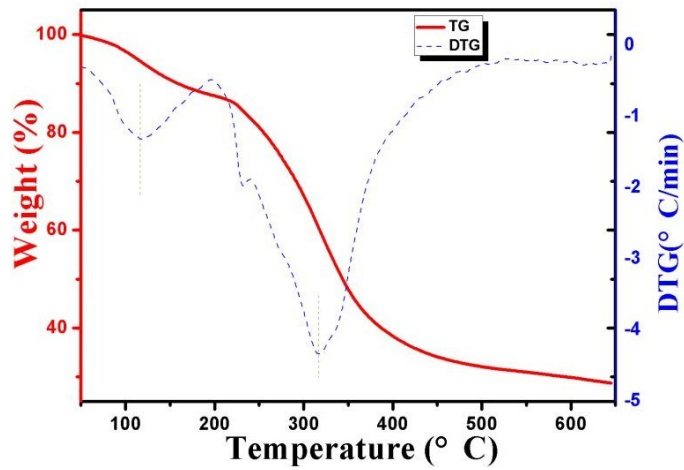


**Figure S9** Digital photographs of G-QDs TFs and GCG-QDs TFs on plastic water dishes after drying in air taken under daylight (A, B) and UV-light (C). The specific composition of the composite membrane is shown in the following **Table S3**.

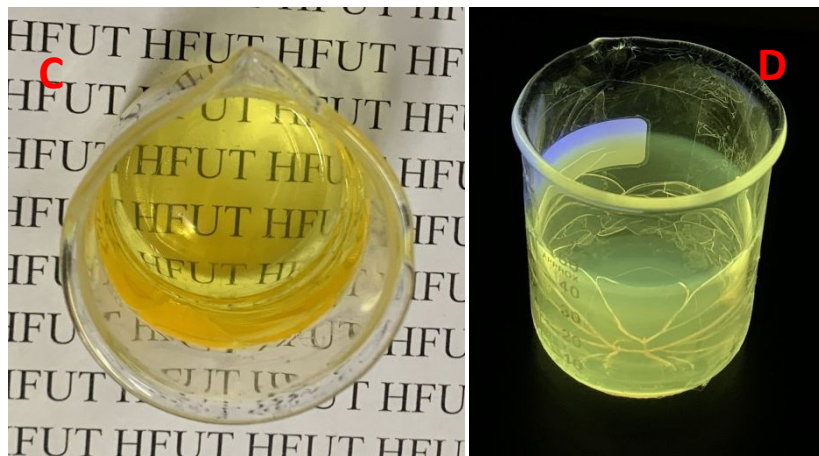
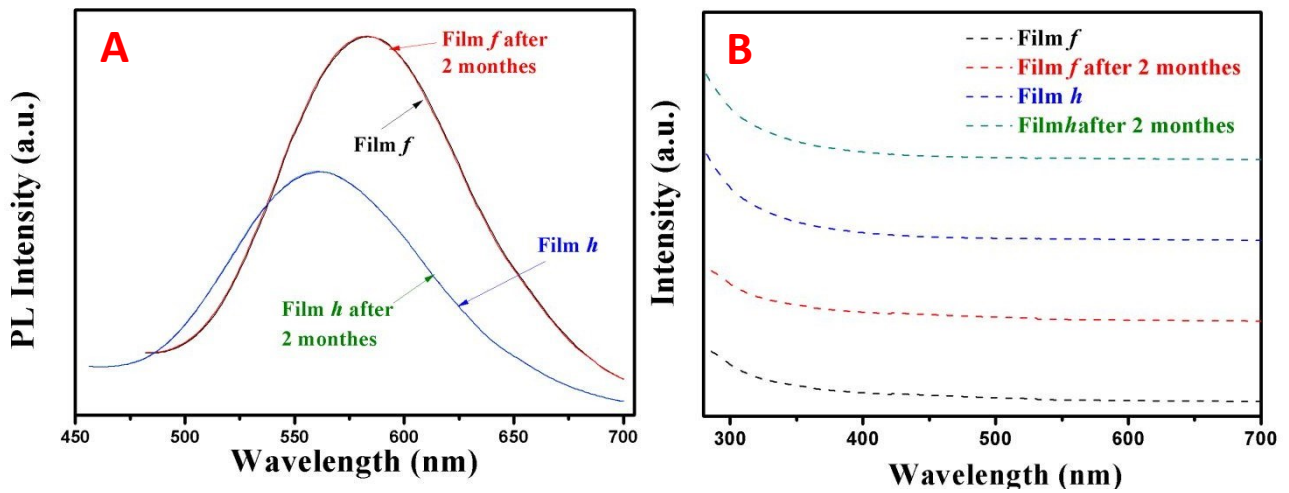


**Figure S10** Digital photographs of G-QDs TFs and GCG-QDs TFs on PVC sheets after drying in air taken under daylight (A) and UV-light (B). The specific composition of the composite membrane is shown in **Table S3**.





**Figure S11** TG and DTG curves for gelatin-chitosan-glycerin/QDs composite films.



**Figure S12** The fluorescence emission spectra (A) and UV-vis absorption spectra (B) of GCG-QDTFs marked as *f* and *h* in Fig. S10 after two months of storage. Digital images of GCG-QD TFs on glass beaker under sunlight (C) and UV-light (D) after two months storage.