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

Supplementary Information

ZnSeTe quantum dots modified with zinc chloride for bright white light-emitting diodes

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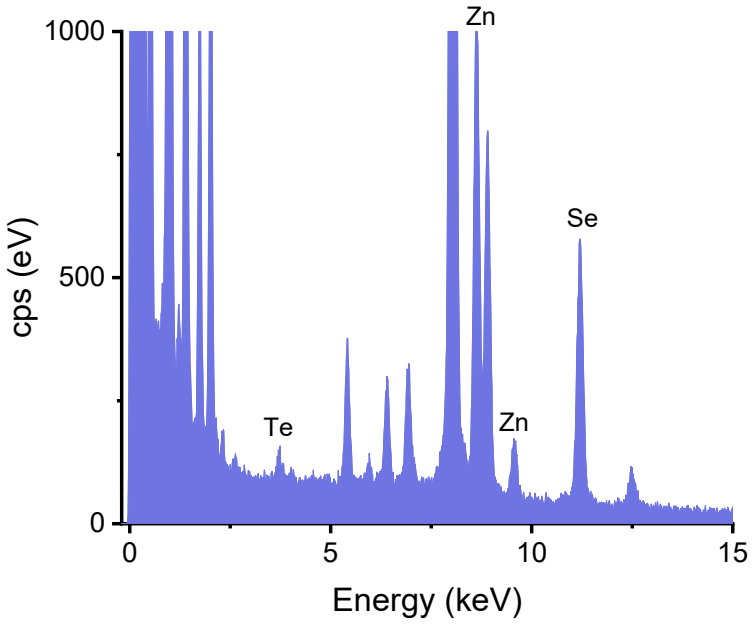

Fig. S1. EDS data of ZnSeTe core.

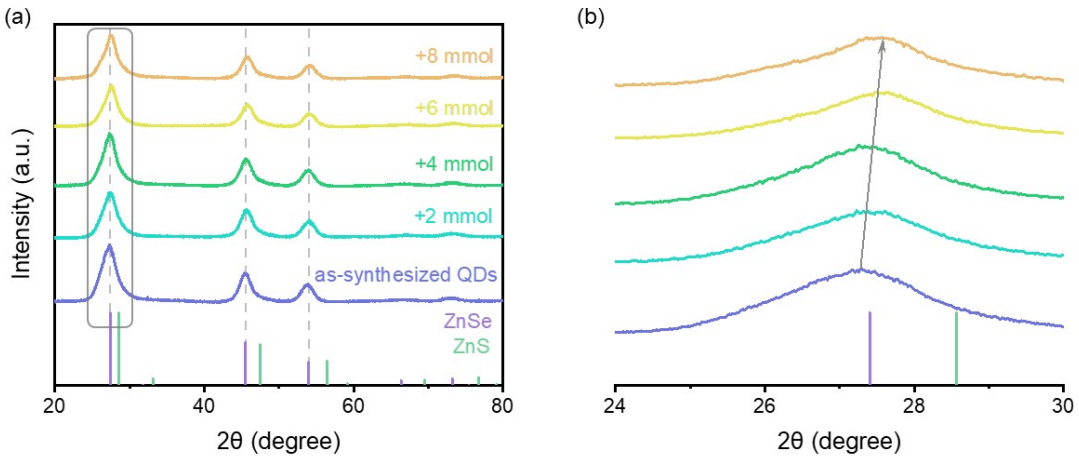

Fig. S2. (a) XRD patterns of the as-synthesized ZnSeTe/ZnSe/ZnSeS/ZnS QDs and ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 2 mmol, 4 mmol, 6 mmol and 8 mmol $ZnCl_2$. At the bottom are the standard PDF (Powder Diffraction File) cards for cubic sphalerite ZnSe (PDF No. 01-070-0777) and ZnS (PDF No. 98-065-1457). (b) A magnified view of the QDs in the diffraction angle range of 24-30°, corresponding to the diffraction peak of the (111) crystal plane.

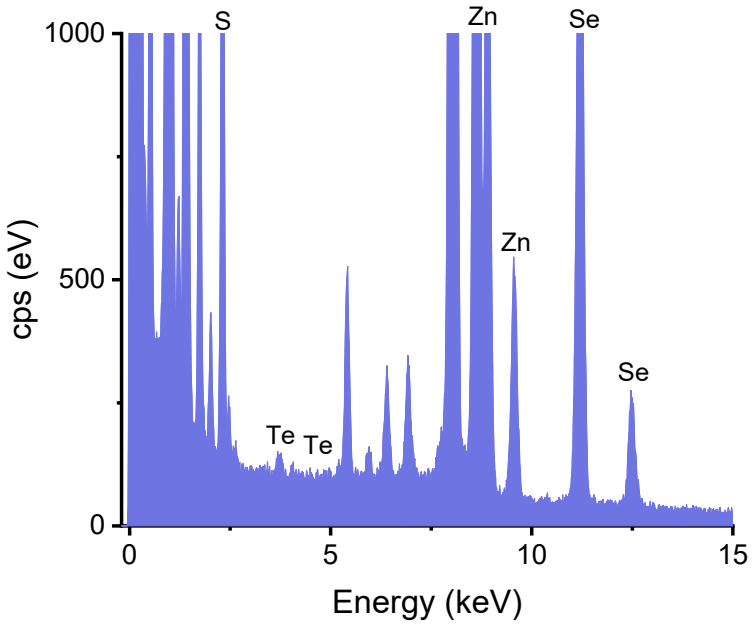

Fig. S3. EDS data of the as-synthesized ZnSeTe/ZnSe/ZnSeS/ZnS QDs.

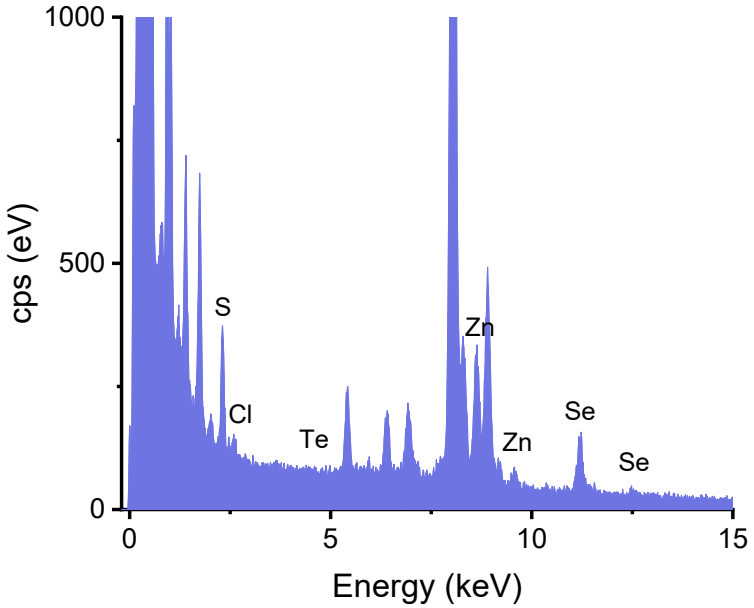

Fig. S4. EDS data of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 2 mmol $ZnCl_2$.

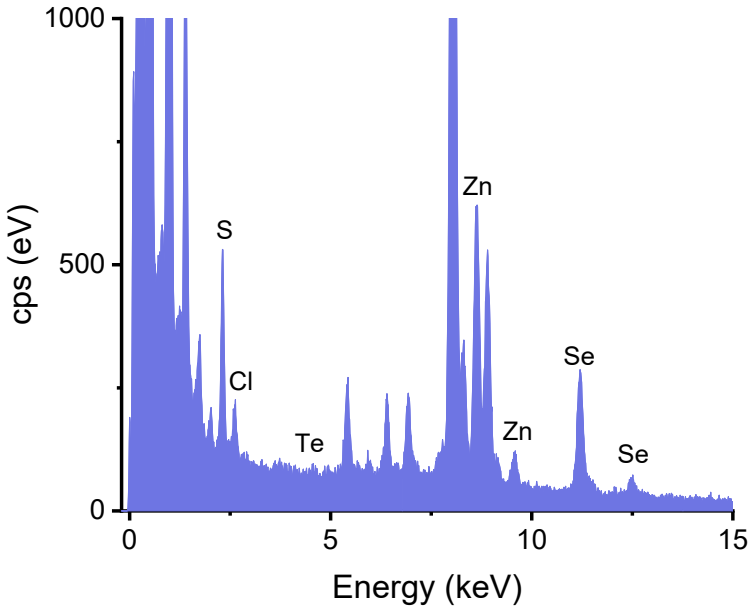

Fig. S5. EDS data of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 4 mmol $ZnCl_2$.

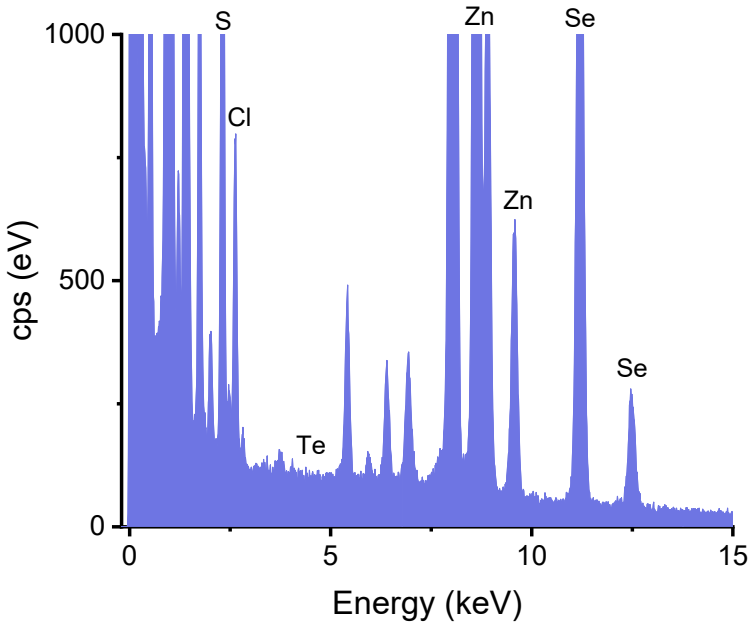

Fig. S6. EDS data of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 6 mmol $ZnCl_2$.

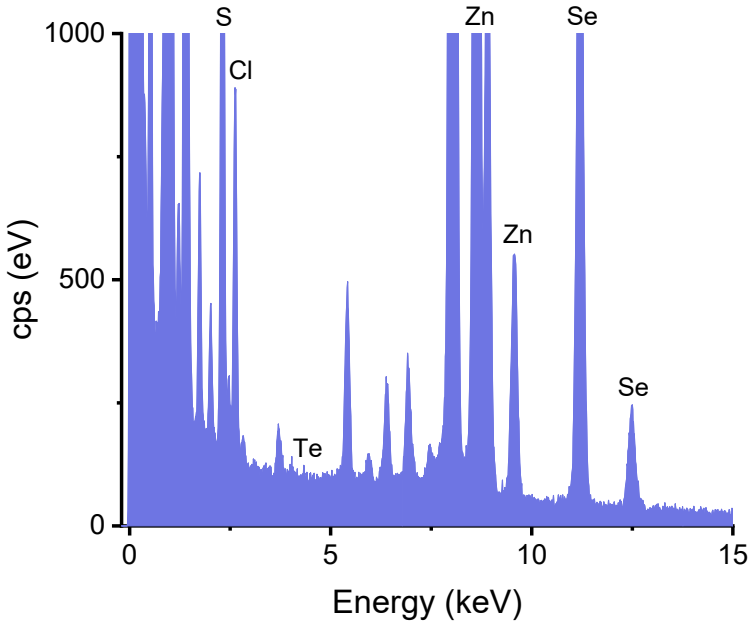

Fig. S7. EDS data of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 8 mmol $ZnCl_2$.

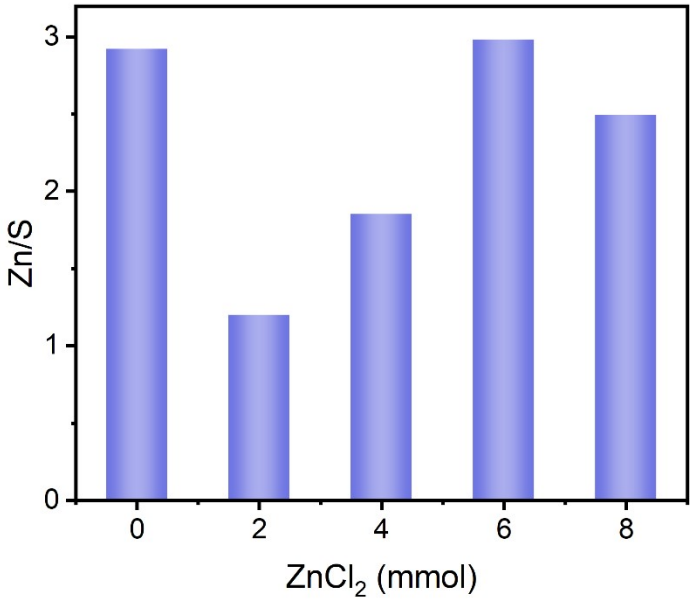

Fig. S8. Atomic ratio of Zn and S in ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with various amount of $ZnCl_2$.

Table S1. PL lifetimes of ZnSeTe/ZnSe/ZnSeS/ZnS QDs (Control) and ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs modified with 2, 4, 6 mmol $ZnCl_2$.

$ZnCl_2$ (mmol)	τ_1 (ns)	f_{B1} (%)	τ_2 (ns)	f_{B2} (%)	τ_3 (ns)	f_{B3} (%)	τ_{ave} (ns)
Control	-	-	24	53.68	94	46.32	56
2	12	8.13	128	31.01	1005	60.85	652
4	10	8.36	131	24.92	995	66.72	697
6	6	10.25	127	24.82	1018	64.92	693

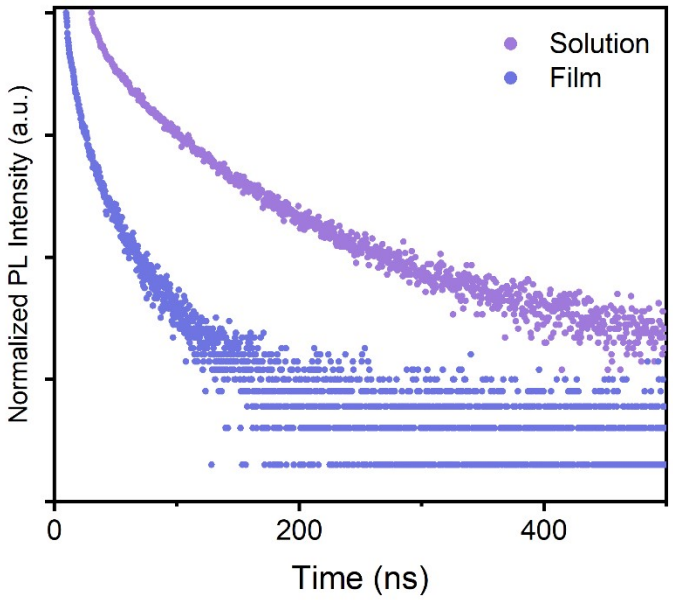

Fig. S9. TRPL decay curves of the as-synthesized ZnSeTe/ZnSe/ZnSeS/ZnS QDs in solution and film states.

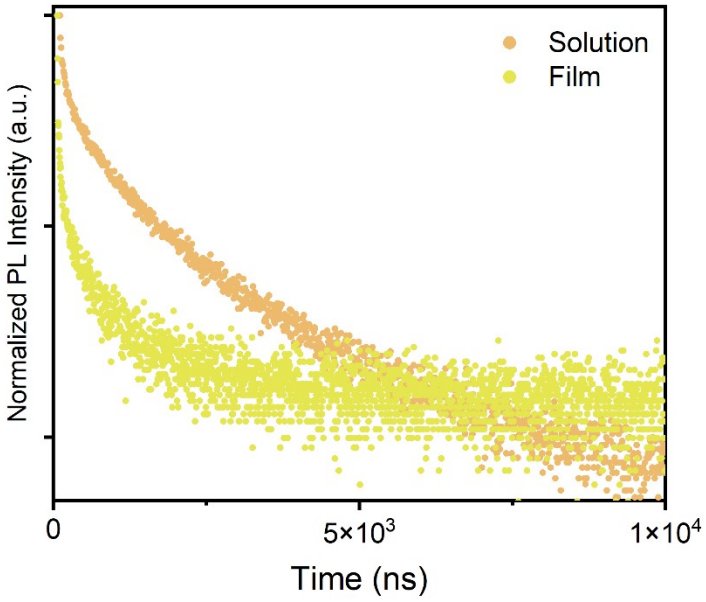

Fig. S10. TRPL decay curves of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs in solution and film states.

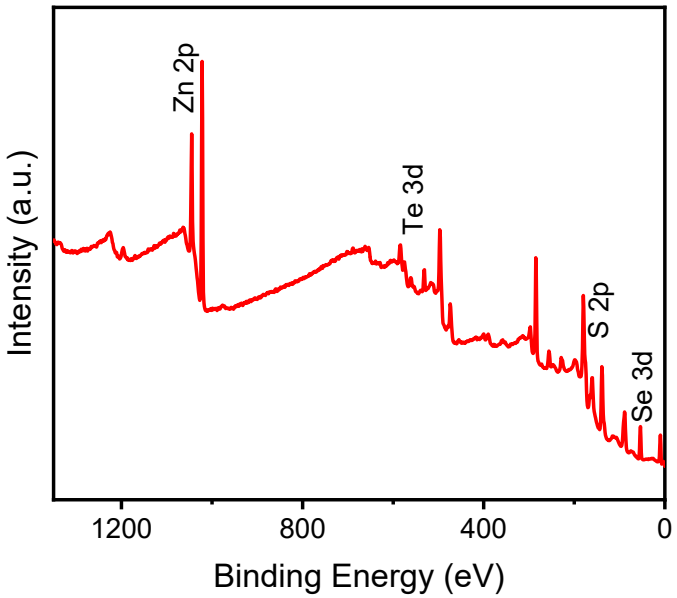

Fig. S11. XPS survey scan of the as-synthesized ZnSeTe/ZnSe/ZnSeS/ZnS QDs.

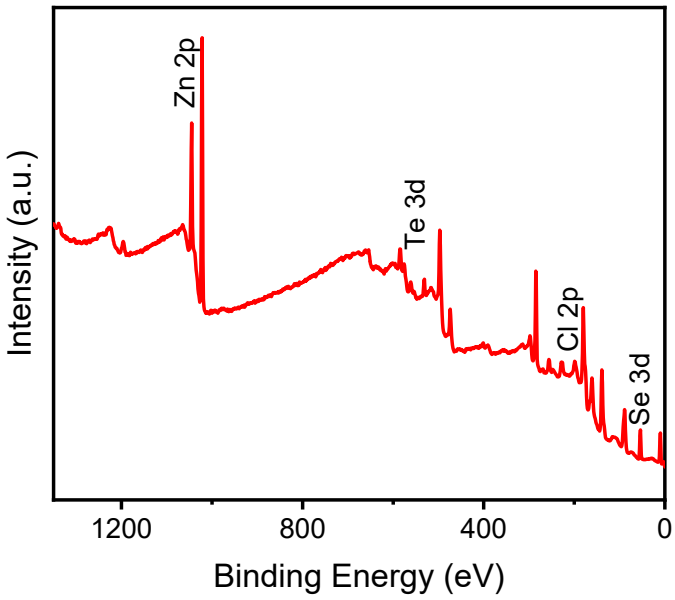

Fig. S12. XPS survey scan of ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs.

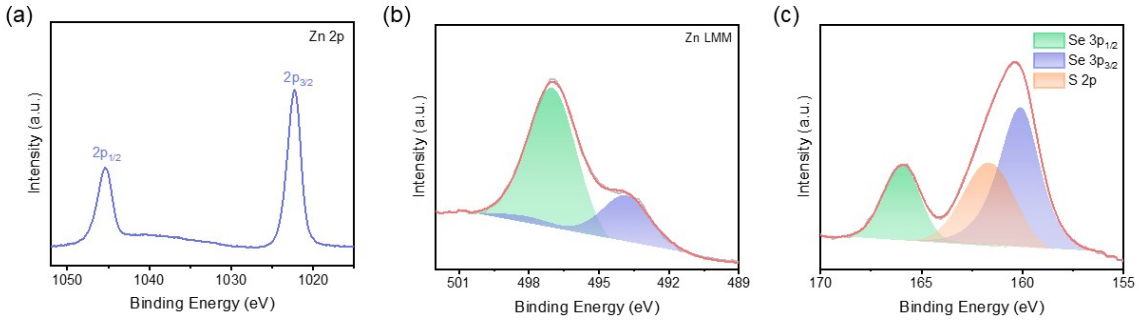

Fig. S13. XPS peaks of (a) Zn 2p, (b) Zn LMM, (c) Se 3p and S 2p orbitals in the as-synthesized ZnSeTe/ZnSe/ZnSeS/ZnS QDs.

Fig. S14. XPS peaks of (a) Zn 2p, (b) Zn LMM, (c) Se 3p and S 2p orbitals in ZnSeTe:$ZnCl_2$/ZnSe/ZnSeS/ZnS QDs.

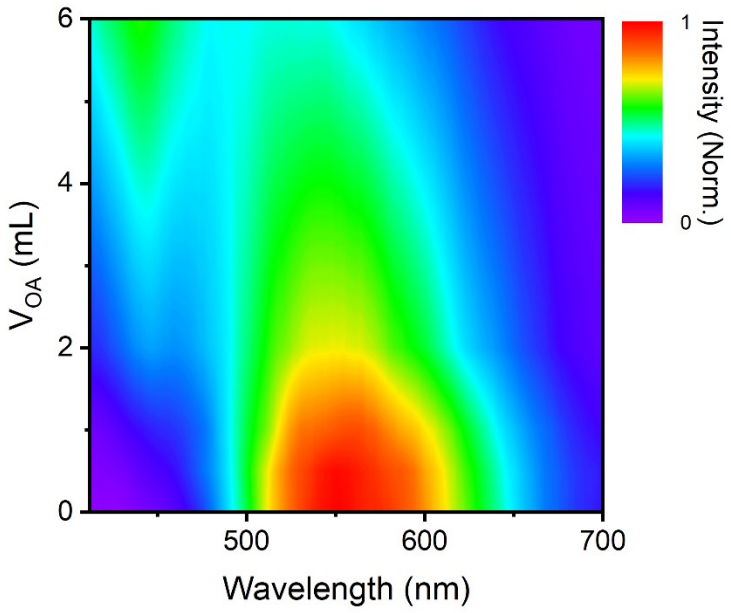

Fig. S15. PL spectra of the QD solution with different amounts of OA added.

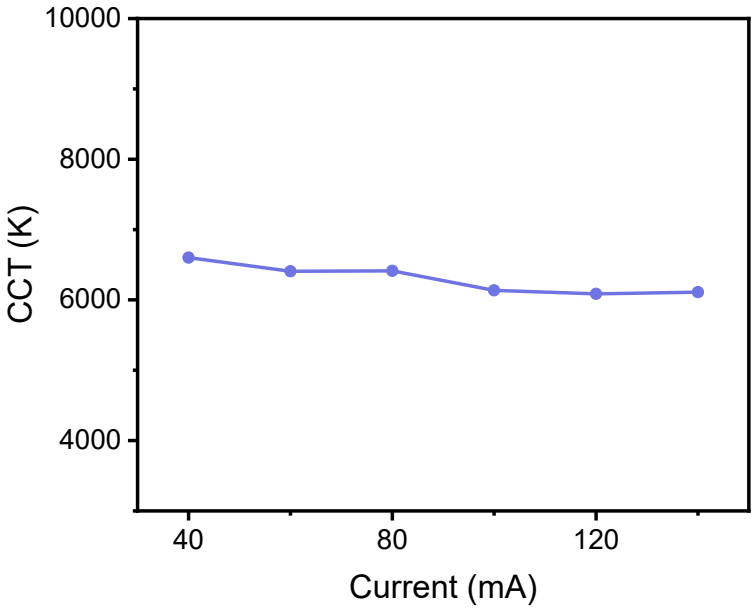

Fig. S16. Correlated color temperature of WLED at various currents.

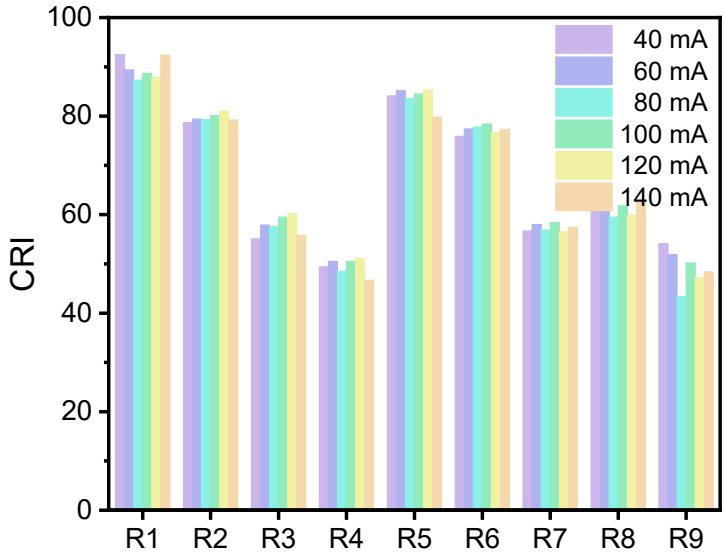

Fig. S17. Color rendering index values of WLED for R1-R9.