

## Supporting information

### **Enhancement of efficiency and thermal stability of the double perovskite $\text{Cs}_2\text{AgInCl}_6$ single crystal by Sc substitution**

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Fig. S1 The picture of  $\text{Cs}_2\text{AgInCl}_6$  crystal

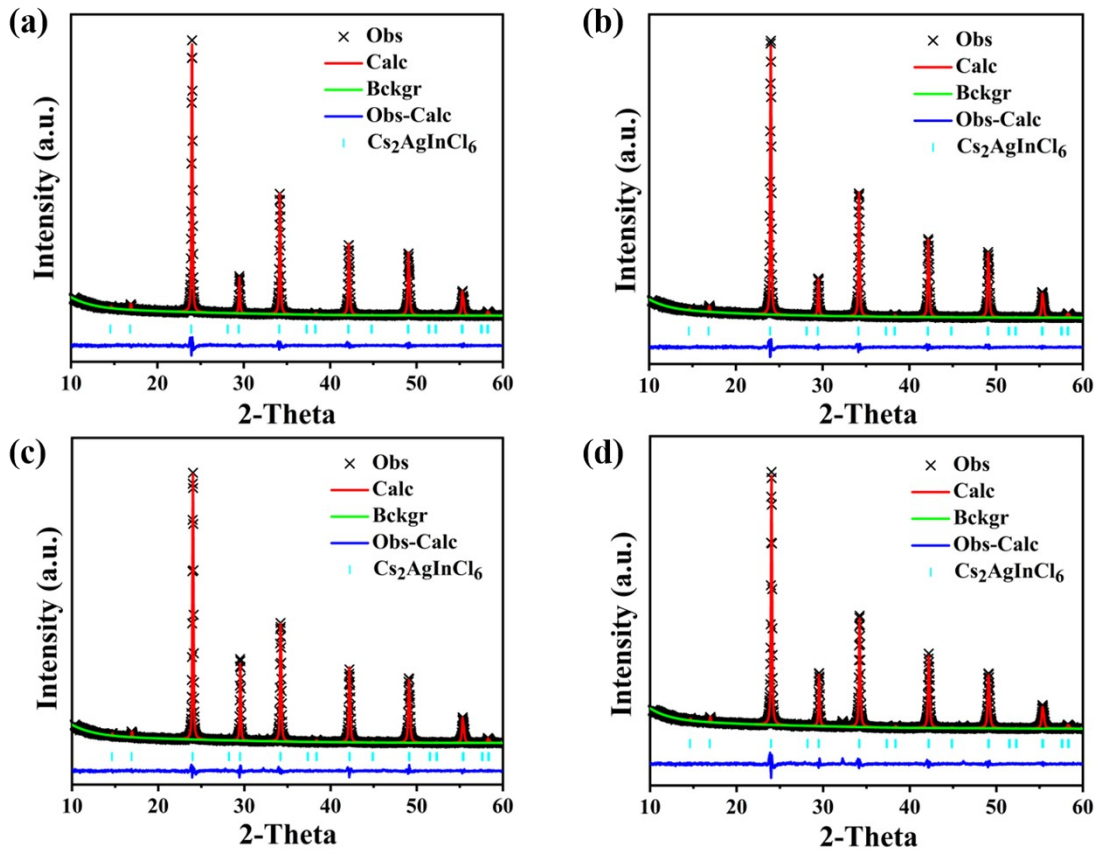


Fig. S2 Rietveld refinement of XRD patterns of (a)  $\text{Cs}_2\text{AgInCl}_6$ , (b)  $\text{Cs}_2\text{AgIn}_{0.8}\text{Sc}_{0.2}\text{Cl}_6$ , (c)  $\text{Cs}_2\text{AgIn}_{0.6}\text{Sc}_{0.4}\text{Cl}_6$  and (d)  $\text{Cs}_2\text{AgIn}_{0.4}\text{Sc}_{0.6}\text{Cl}_6$ .

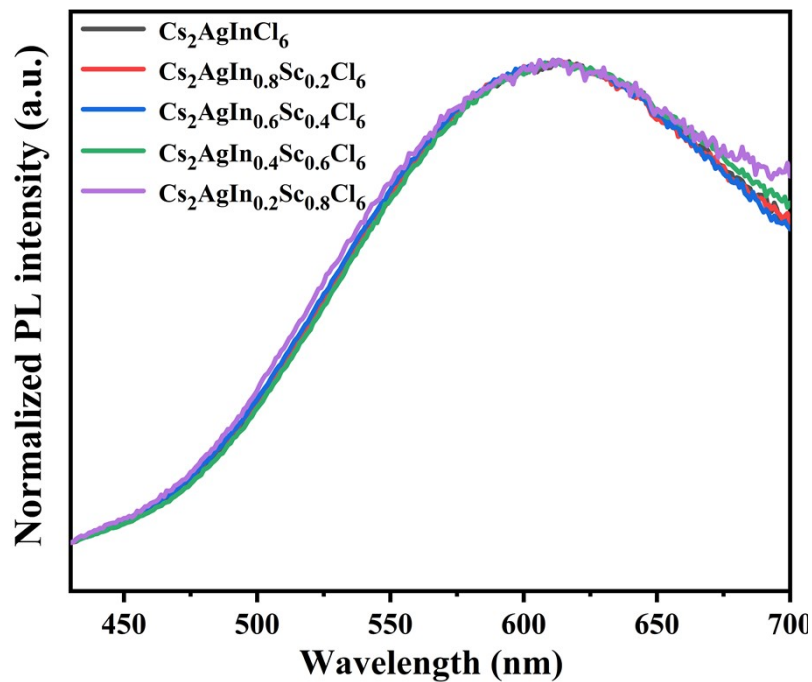


Fig. S3 Normalized PL spectra of  $\text{Cs}_2\text{AgIn}_{1-x}\text{Sc}_x\text{Cl}_6$  ( $x = 0, 0.2, 0.4, 0.6$  and  $0.8$ ) SCs.

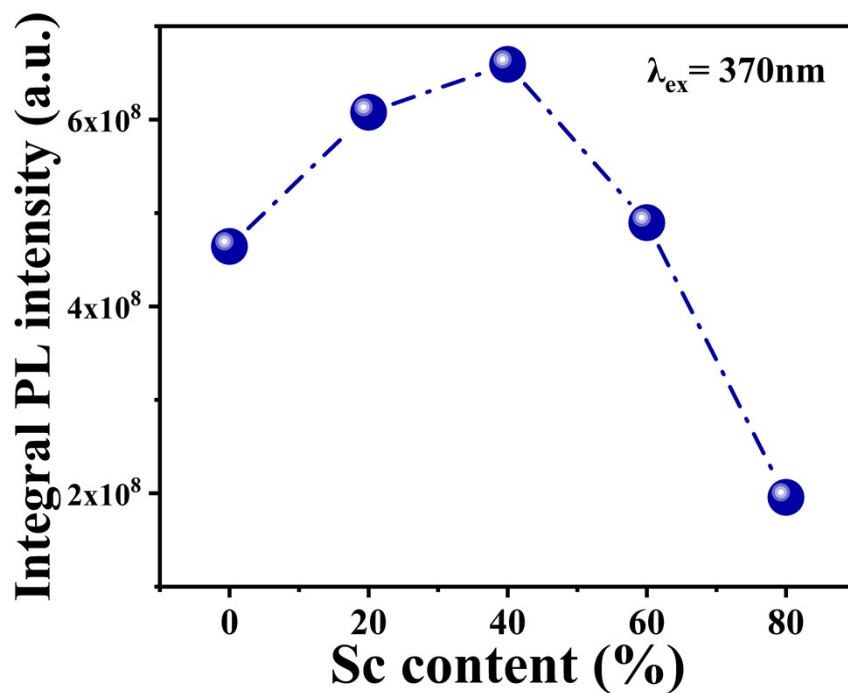


Fig. S4 The integral intensity of PL spectra of  $\text{Cs}_2\text{AgIn}_{1-x}\text{Sc}_x\text{Cl}_6$  ( $x = 0, 0.2, 0.4, 0.6$  and  $0.8$ ) single crystals.

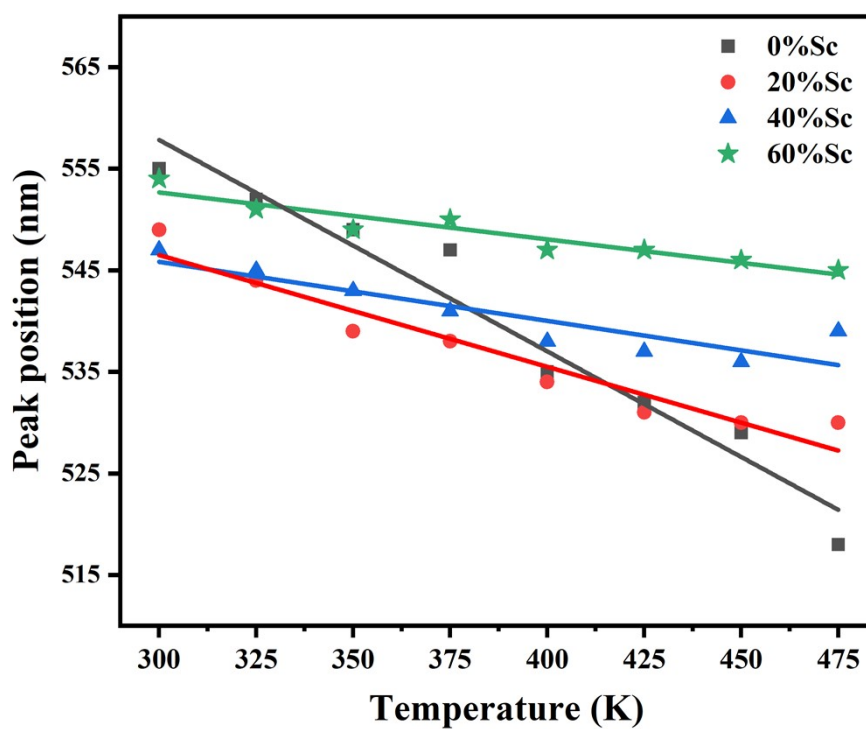


Fig. S5 Relationship between the peak position and the temperature of  $\text{Cs}_2\text{AgIn}_{1-x}\text{Sc}_x\text{Cl}_6$  ( $x = 0, 0.2, 0.4$  and  $0.6$ ) SCs.

Table S1 The refined crystal structure of  $\text{Cs}_2\text{AgIn}_{1-x}\text{Sc}_x\text{Cl}_6$  ( $x = 0, 0.2, 0.4$  and  $0.6$ ) at room temperature.

Samples	Space group	Cell parameter, $a(\text{\AA})$	Z	Occupancy of Sc (%)	$R_p$ (%)	$R_{wp}$ (%)	$\chi^2$
$\text{Cs}_2\text{AgInCl}_6$	$Fm\bar{3}m$	10.5019	4	0	4.76	6.01	1.84
$\text{Cs}_2\text{AgIn}_{0.8}\text{Sc}_{0.2}\text{Cl}_6$	$Fm\bar{3}m$	10.5010	4	3.88	4.24	5.39	1.68
$\text{Cs}_2\text{AgIn}_{0.6}\text{Sc}_{0.4}\text{Cl}_6$	$Fm\bar{3}m$	10.4955	4	5.21	4.36	5.55	1.81
$\text{Cs}_2\text{AgIn}_{0.4}\text{Sc}_{0.6}\text{Cl}_6$	$Fm\bar{3}m$	10.4947	4	5.44	5.65	7.361	2.26