Supporting Information

Zero-dimensional indium hybrid and modulated photoluminescence by Sb doping

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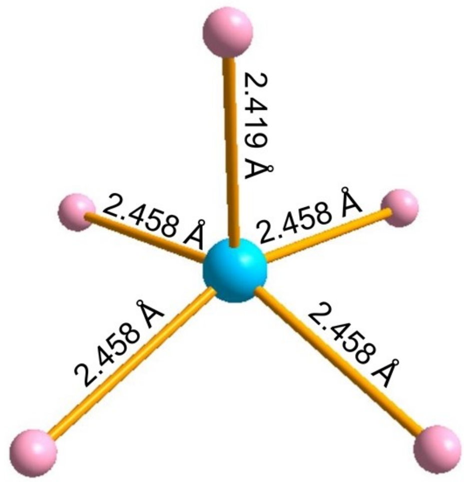

Fig. S1. The In-Cl bond lengths in the $[InCl_5]^{2-}$ square pyramid structure.

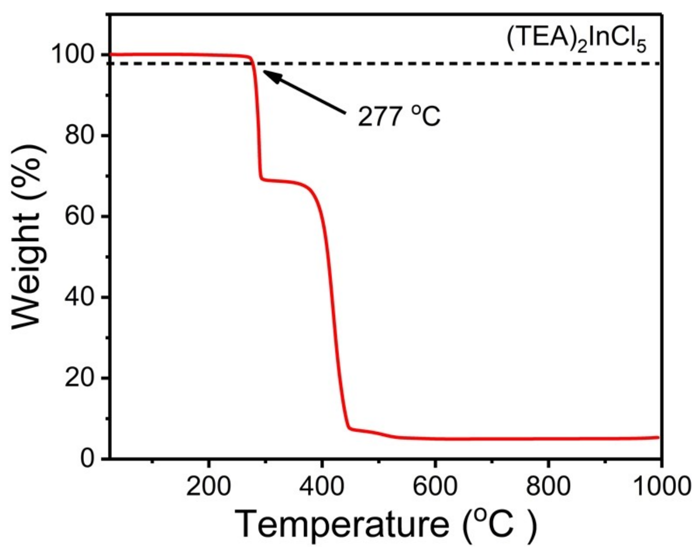

Fig. S2. The TGA data of the as-synthesized $(TEA)_2InCl_5$.

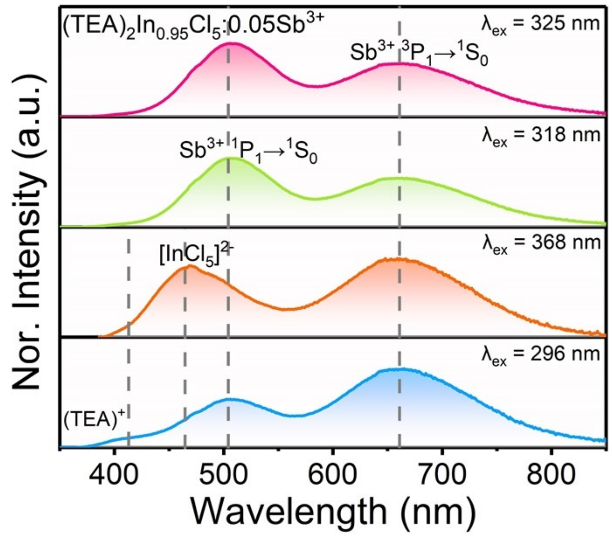

Fig. S3. Room-temperature PL spectra of $(TEA)_2In_{0.95}Cl_5$:$0.05Sb^{3+}$.

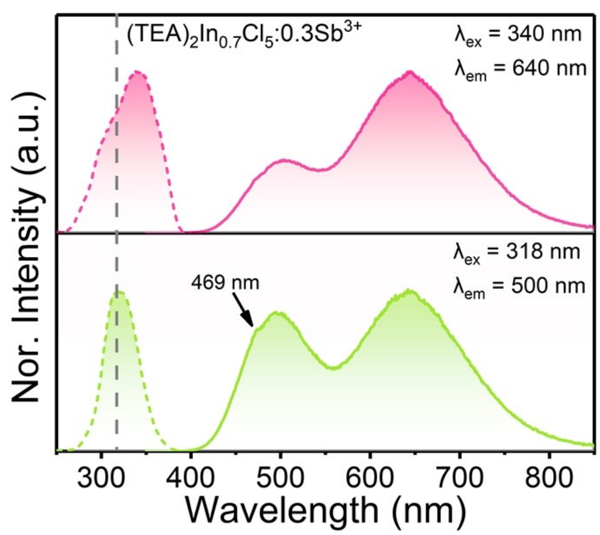

Fig. S4. The PL and PLE spectra of $(TEA)_2In_{0.7}Cl_5$:$0.3Sb^{3+}$.

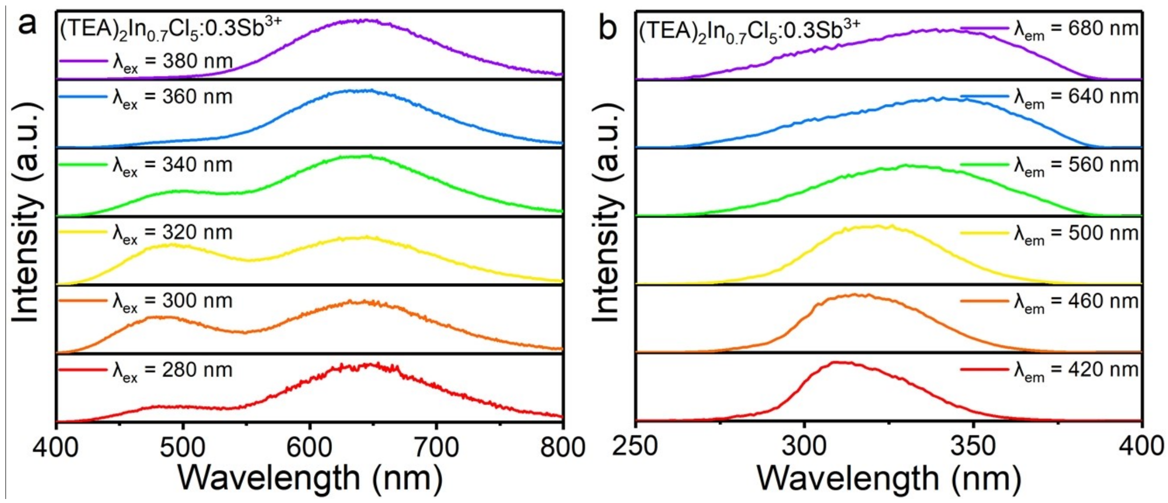

Fig. S5. Wavelength-dependent (a) PL and (b) PLE spectra of $(TEA)_2In_{0.7}Cl_5$:$0.3Sb^{3+}$.

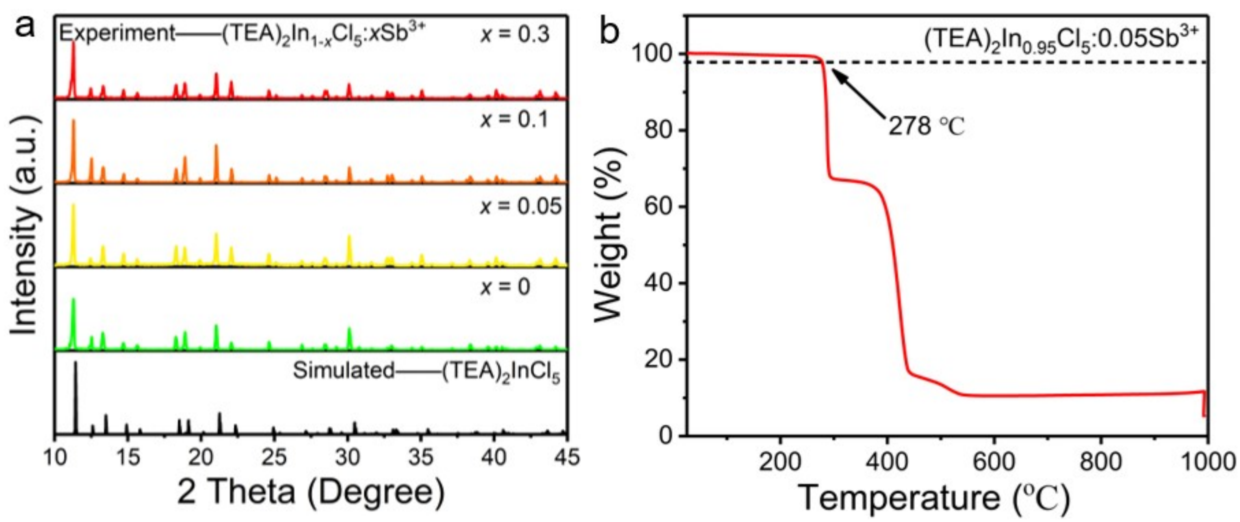

Fig. S6. (a) PXRD patterns of $(TEA)_2In_{1\text{-}x}Cl_5$:$xSb^{3+}$ after 90 days of exposure to light and moisture conditions. (b) The TGA data of $(TEA)_2In_{0.95}Cl_5$:$0.05Sb^{3+}$.

Table S1. Comparison of structural and photoluminescent properties of the reported 0D In-based OIMHs.

Compound	Inorganic units	λ_{em} (nm)	PLQY (%)	Ref
$(PMA)_3InBr_6$	$[InBr_6]^{3-}$	610	35	1
$(C_8NH_{12})_6InBr_9\cdot H_2O$	$[InBr_6]^{3-}$	475, 700	8.85	2
$(PEA)_4NaInCl_8$	$[InCl_6]^{3-}$	282	＜1	3
$(PEA)_2CsNaInCl_7$	$[InCl_6]^{3-}$	282	＜1	3
$TpyInCl_3$	$[InN_3Cl_3]^{3-}$	465, 575	6.06	4
$InCl_6(C_4H_{10}SN)_4\cdot Cl$	$[InCl_6]^{3-}$	550	20	5
$[DAPEDA]InCl_6\cdot Cl\cdot H_2O$	$[InCl_6]^{3-}$	520	40.4	6
$[DPA]_3InCl_6$	$[InCl_6]^{3-}$	510	34.01	6
$(C_2H_8N)_4InCl_7$	$[InCl_6]^{3-}$	405, 620	13.9	7
AEPz-In	$[InCl_6]^{3-}$	444, 538	1.38, 6.42	8
AMPd-In	$[InCl_6]^{3-}$	443, 562	6.41, 19.02	8
PhPz-In	$[InCl_6]^{3-}$	443, 575	20, 20.15	8
$(CH_3NH_3)_4InCl_6\cdot Cl$	$[InCl_6]^{3-}$	-	-	9
$(C_7H_8N_3)_3InCl_6\cdot H_2O$	$[InCl_6]^{3-}$	558	＜1	10
$(C_7H_8N_3)_3InBr_6\cdot H_2O$	$[InBr_6]^{3-}$	595	5	10
$TpyInCl_5$	$[In_2Cl_{10}]^{3-}$	465	47.66	4
$BAPPIn_2Cl_{10}$	$[In_2Cl_{10}]^{4-}$	440	8	11
$(C_4H_{14}N_2)_2In_2Br_{10}$	$[InBr_6]^{3-}+[InBr_4]^{-}$	445, 670	3	12
$(C_{11}H_{24}N_2)_2[InBr_6][InBr_4]$	$[InBr_6]^{3-}+[InBr_4]^{-}$	660	8	13
$RInBr_4$	$[InBr_4]^{-}$	437, 451	16.36	14
$(C_{20}H_{20}P)_2InCl_5$	$[InCl_5]^{2-}$	-	-	15
$(C_6H_{18}N_2)InCl_5\cdot H_2O$	$[InCl_5]^{2-}$	-	-	16
$(C_{13}H_{14}N)_2InCl_5$	$[InCl_5]^{2-}$	435	5.44	17
$(TEA)_2InCl_5$	$[InCl_5]^{2-}$	468	30.11	This work

Table S2. Single crystal X-ray diffraction data and collection parameters. The collection was performed at a temperature of 150 K.

Empirical formula	$C_{16}H_{40}Cl_5InN_2$
Formula weight	552.57
Temperature/K	150.0
Crystal system	tetragonal
Space group	*P4*/*n*
a/Å	9.2680(2)
b/Å	9.2680(2)
c/Å	14.0369(6)
α°	90
β°	90
γ°	90
Volume/Å^3	1205.71(7)
Z	2
ρ_{calc}g/cm^3	1.522
μ/mm^{-1}	1.537
F(000)	568.0
Crystal size/mm^3	0.2×0.15×0.1
Radiation	MoKα (λ = 0.71073)
2θ range for data collection/°	2.902 to 52.718
Index ranges	$-11 \le h \le 11$, $-11 \le k \le 9$, $-17 \le l \le 17$
Reflections collected	11320
Independent reflections	1244 [R_{int} = 0.0243, R_{sigma} = 0.0126]
Data/restraints/parameters	1244/0/78
Goodness-of-fit on F^2	1.120
Final *R* indexes [*I*>=2σ (*I*)]	R_1 = 0.0317, wR_2 = 0.0935
Final *R* indexes [all data]	R_1 = 0.0350, wR_2 = 0.0960
Largest diff. peak/hole / e Å^{-3}	1.68/-0.60

Table S3. CIE chromaticity Coordinates and CCT for $(TEA)_2In_{1-x}Cl_5$:$x$$Sb^{3+}$ under different conditions.

Sample No.	Composition	CIE (x, y)	CCT	λ_{ex} (nm)
1	x = 0.3	(0.483, 0.384)	2569	280
2	x = 0.3	(0.367, 0.330)	4054	318
3	x = 0.3	(0.397, 0.353)	3424	330
4	x = 0.3	(0.436, 0.376)	2918	340
5	x = 0.3	(0.547, 0.413)	2617	368
6	x = 0	(0.143, 0.111)	18113	368
7	x = 0.05	(0.345, 0.275)	4592	368
8	x = 0.1	(0.536, 0.394)	2659	368

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