

A Lead-free Semiconducting Hybrid with Ultra-high Color Rendering Index White Light-emission

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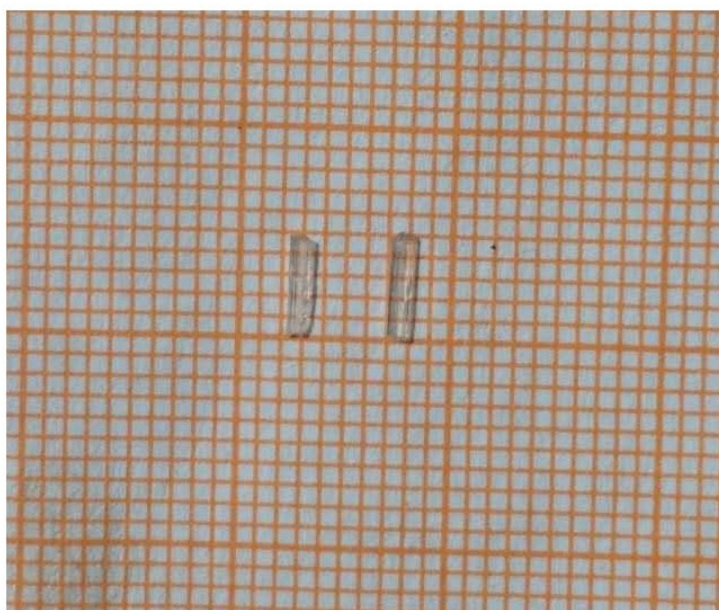


Figure S1. Colorless needle like Single crystal of 4-MPSC

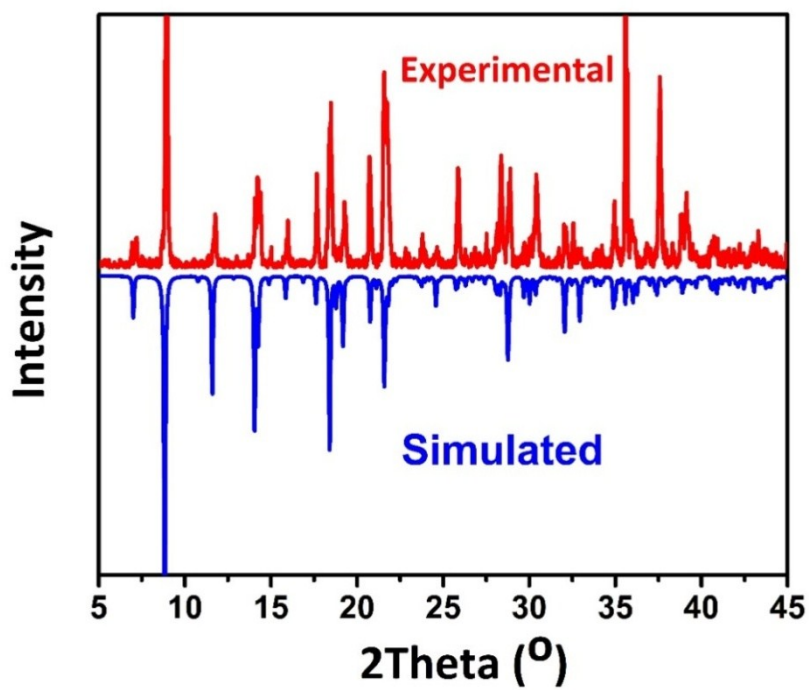


Figure S2. PXRD patterns of 4-MPSC.

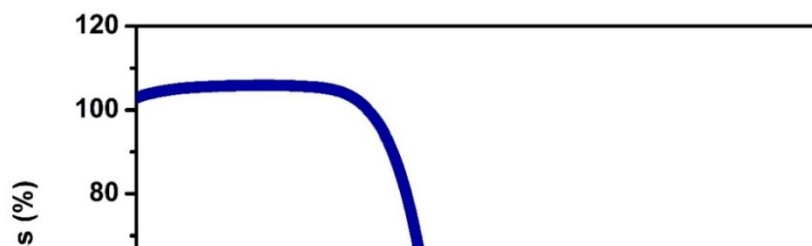


Figure S3. TG curve of 4-MPSC.

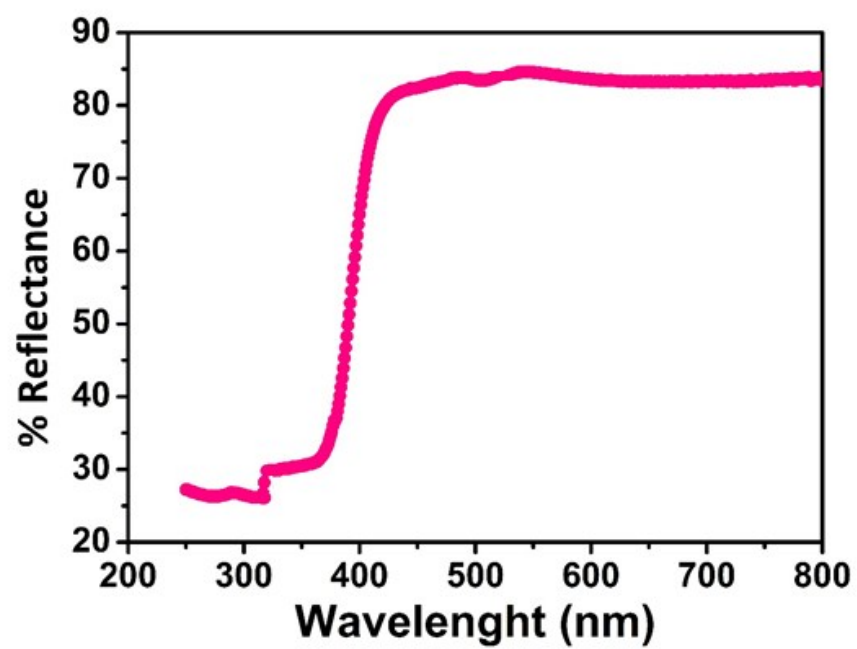


Figure S4. UV-vis diffuse reflectance spectroscopy of 4-MPSC.

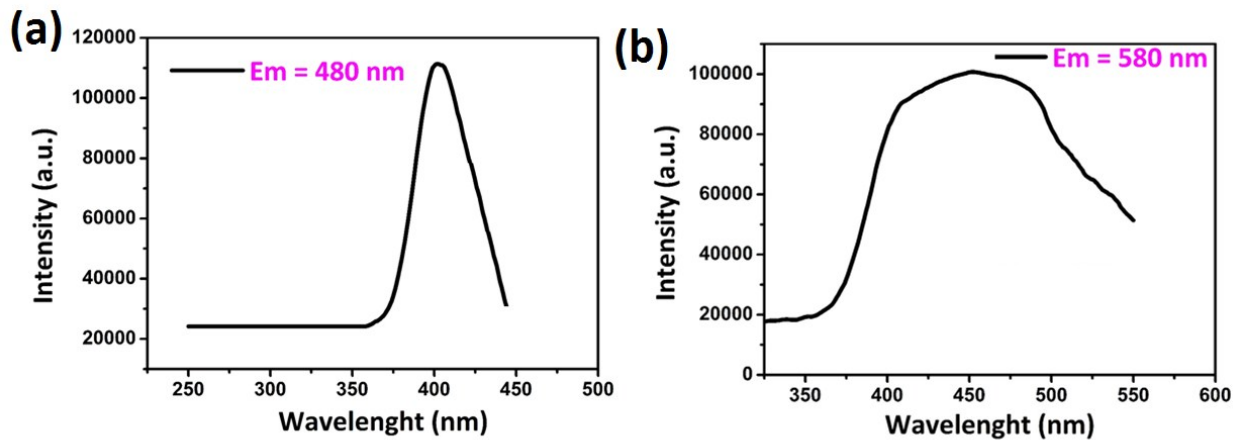


Figure S5.(a) Excitation spectrum of 4-MPSC at 480 nm and (b) 580 nm.

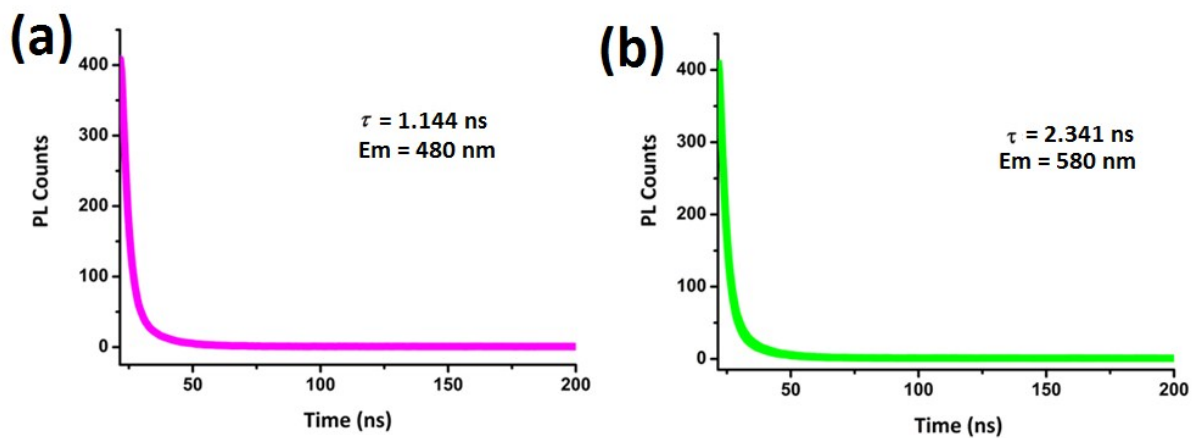


Figure S6. Luminescence decay data of 4-MPSC at (a) 480 nm (b) and 580 nm.

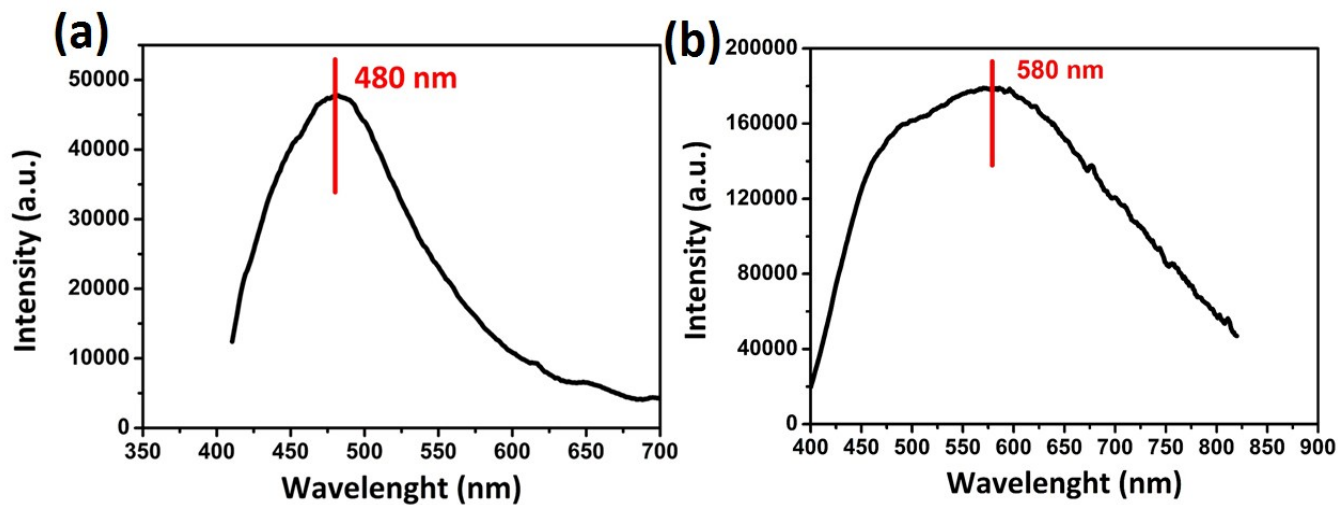


Figure S7. Emission spectrum of (a) [4-methyl Piperidium]⁺Cl⁻ and (b) SbCl₅.

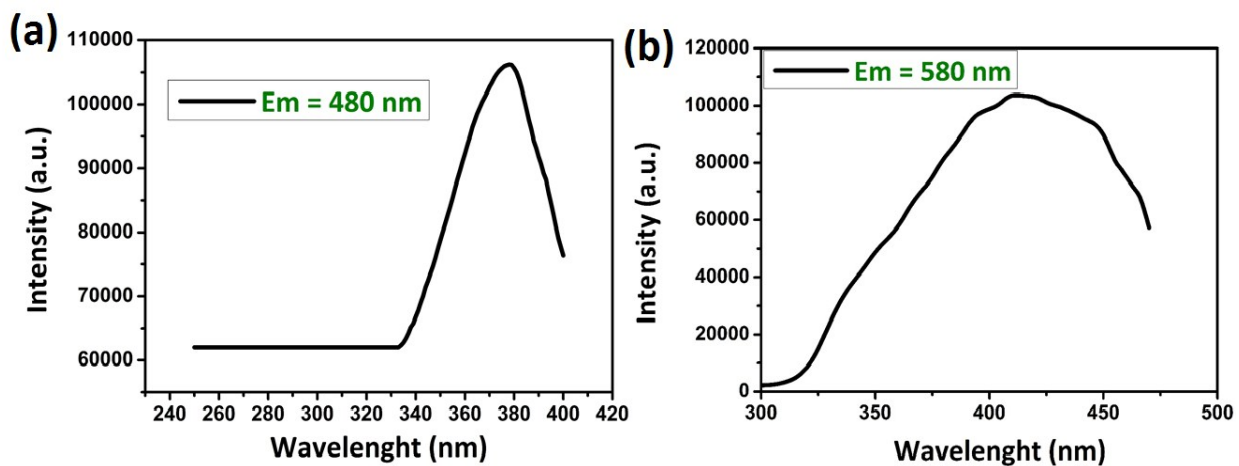


Figure S8. Excitation spectrum of (a) [4-methyl Piperidium]⁺Cl⁻ and (b) SbCl₅.

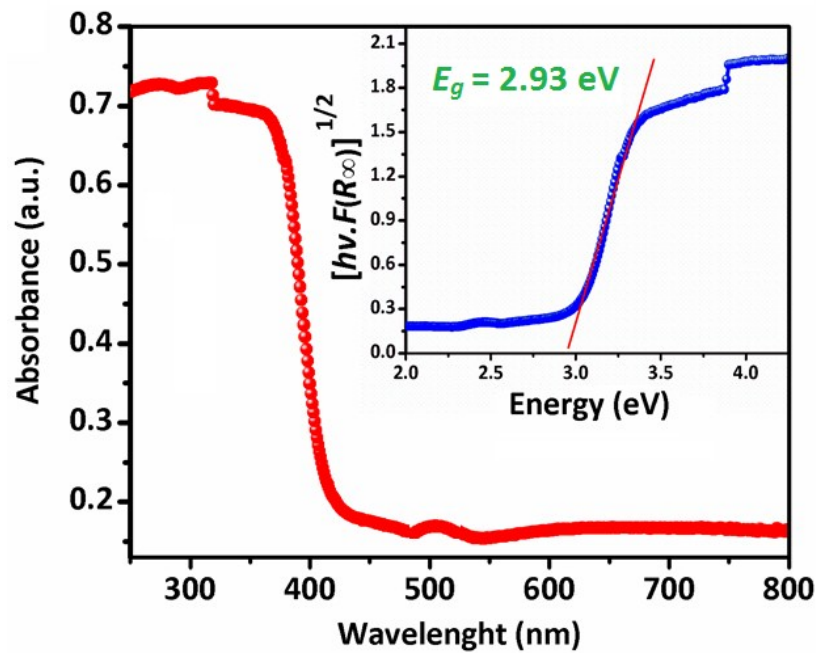


Figure S9. UV-vis absorption spectra of 4-MPSC, inset: the optical bandgap deduced from the *Tauc* plot.

Table S1. Crystallographic data and structure refinement of **4-MPSC**.

Formula	C ₁₂ H ₂₈ Cl ₅ N ₂ Sb
Formula weight (g/mol)	499.36
Temperature (K)	215
Crystal system	Monoclinic
Space group	<i>P</i> 21/ <i>c</i>
<i>a</i> (Å)	12.9832(2)
<i>b</i> (Å)	16.4632(2)
<i>c</i> (Å)	9.72240(10)
<i>α</i> (deg)	90
<i>β</i> (deg)	103.823(1)
<i>γ</i> (deg)	90
<i>V</i> (Å ³)	2017.93
<i>Z</i>	4
R-Factor (%)	5.69
D _{calc} (g/cm ³)	1.677
<i>F</i> (000)	1000.0
Completeness (%)	99.2
GOF (<i>F</i> ²)	1.105
<i>R</i> 1 (on <i>F</i> _o ² , <i>I</i> > 2 <i>s</i> (<i>I</i>))	0.0570
<i>wR</i> 2 (on <i>F</i> _o ² , <i>I</i> > 2 <i>s</i> (<i>I</i>))	0.1400
$^aR_1 = \sum F_0 - F_c / \sum F_0 , \omega R_2 = [\sum [\omega(F_0^2 - F_c^2)^2] / \sum [\omega(F_0^2)^2]]^{1/2}$	

Table S2. Selected bond length (Å).

Bond	[Å]
Sb2-Cl1	2.608(1)
Sb2-Cl2	2.482(1)
Sb2-Cl3	3.199(1)
Sb2-Cl4	2.637(9)
Sb2-Cl5	2.865(1)
Sb2-Cl6	2.424(1)

Table S3. The length of H-bonds of **4-MPSC**

Bond	[Å]
(N ₁₀ - H _{10A} ...Cl ₅)	3.273 Å
(N ₁₀ - H _{10B} ...Cl ₃)	3.293 Å