Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Broadband white-light emission with high color rendering index in a two-dimensional organic-inorganic hybrid perovskite

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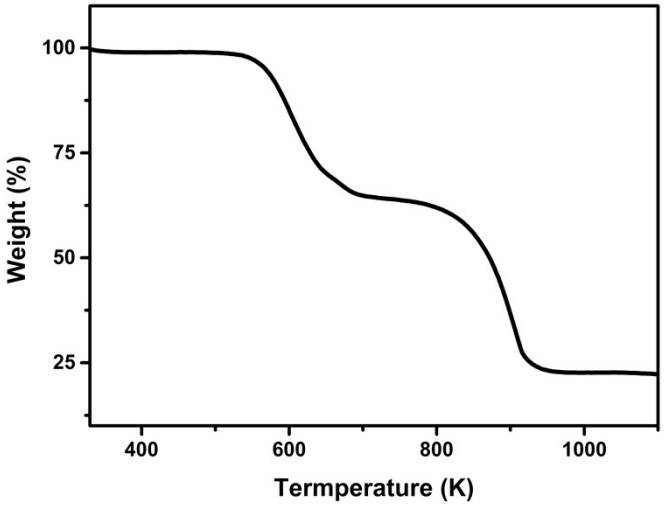

Figure S1 The TG measurement shows that **1** has a high thermal stability up to 550 K.

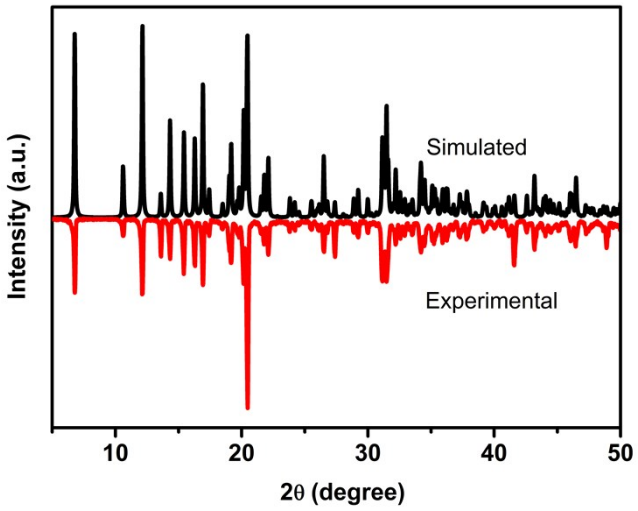

Figure S2 Powder X-ray patterns of simulated and experimental for **1**.

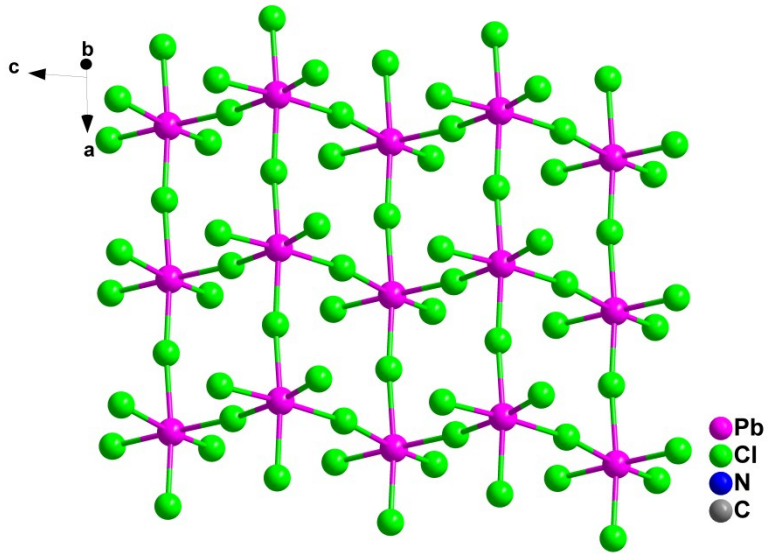

Figure S3 The inorganic layer of **1** extend along the crystallographic *ac* plane

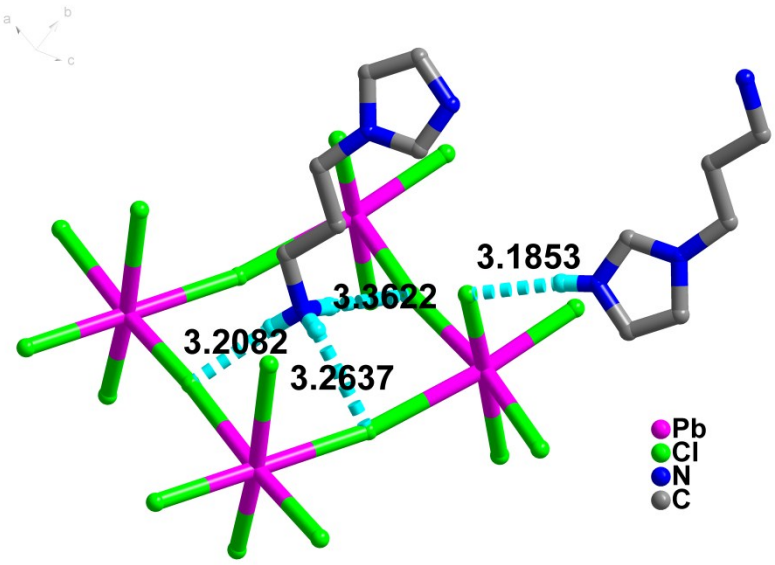

Figure S4 The primary ammonium on the end of organic cation forms three hydrogen bonds by three double-bridged Br atoms, and imidazole on the other end of cation forms one hydrogen bond by terminal Br atom.

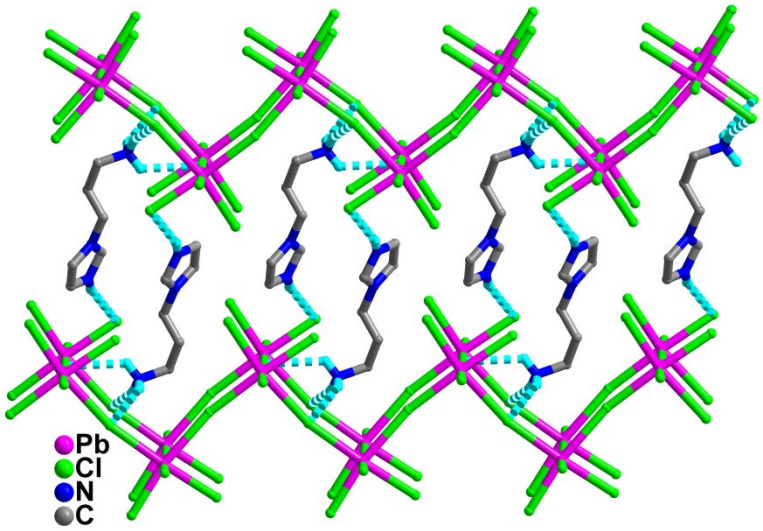

Figure S5 The corrugated layers are stabilized by hydrogen bonds interaction.

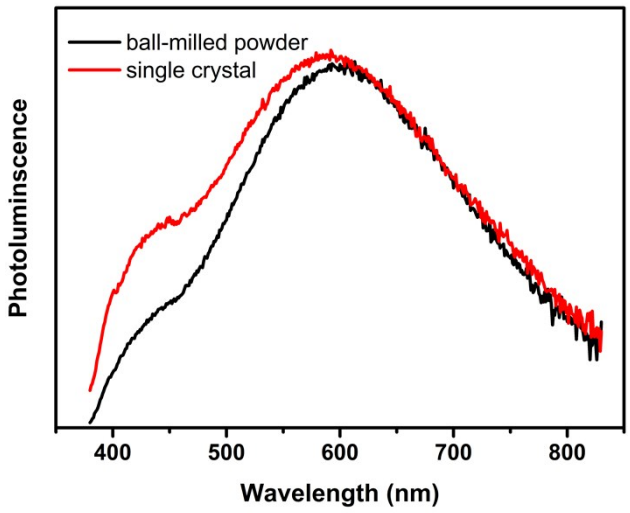

Figure S6 The photoluminescence spectra of ball-milled powder and single crystal.

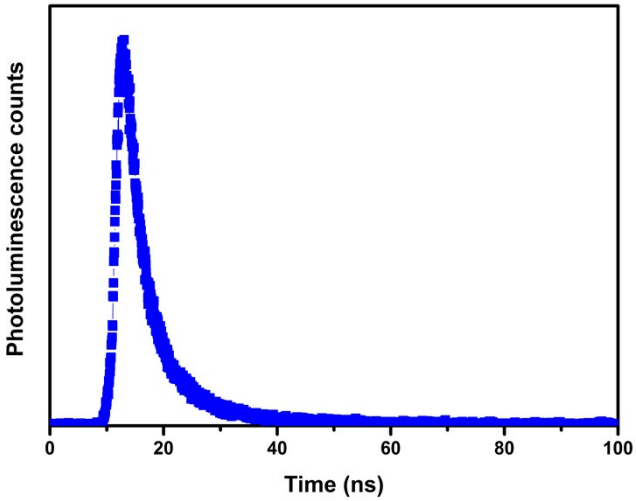

Figure S7 The lifetimes were calculated to be 4.416 ns.

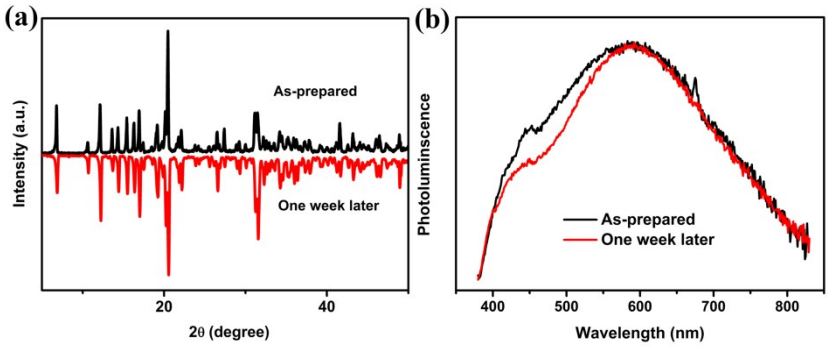

Figure S8 (a) Powder XRD patterns and (b) photoluminescence spectra of as-prepared sample and that after one week of storage in ambient condition.

Table 1. Crystal data and structure refinement for **1.**

Empirical formula	$C_6H_{13}Cl_4N_3Pb$
Formula weight	476.18
Temperature, K	298(2)
Crystal system, space group	Monoclinic, $P2_1/c$
a, Å	5.7639(2)
b, Å	8.7926(4)
c, Å	26.1501(12)
α, deg	90
β, deg	95.237(2)
γ, deg	90
V, Å^3	1320.29(10)
Z, Calculated density	4, 2.396
Absorption coefficient	13.557
F(000)	880
Theta range, deg	3.13 to 27.48
Limiting indices	-7<=h<=7
	-11<=k<=11
	-33<=l<=33
Reflections collected / unique	15449 / 3027
Completeness	99.8 %
Data / restraints / parameters	3027 / 3 / 128
Goodness-of-fit on F^2	1.026
Final *R* indices [I>2sigma(I)]	R_1 = 0.0291, wR_2 = 0.0627
R indices (all data)	R_1 = 0.0409, wR_2 = 0.0690

[a] $R_1 = \Sigma||F_o|-|F_c||/\Sigma|F_o|$, $wR_2 = \{\Sigma[w(F_o^2-F_c^2)^2]/\Sigma w[(F_o)^2]^2\}^{1/2}$

Table 2. Selected bond lengths [Å] and angles [deg] for distorted octahedron of **1.**

Pb(1)-Cl(2)	2.7114(16)	Cl(2)-Pb(1)-Cl(3)	89.16(6)
Pb(1)-Cl(3)	2.7725(19)	Cl(2)-Pb(1)-Cl(4)	92.75(5)
Pb(1)-Cl(4)	2.8720(14)	Cl(3)-Pb(1)-Cl(4)	86.99(7)
Pb(1)-Cl(4)#1	2.8948(14)	Cl(2)-Pb(1)-Cl(4)#1	89.57(5)
Pb(1)-Cl(1)	2.9525(19)	Cl(3)-Pb(1)-Cl(4)#1	90.31(7)
Pb(1)-Cl(1)#2	3.0560(19)	Cl(2)-Pb(1)-Cl(1)	94.78(6)
		Cl(4)-Pb(1)-Cl(1)	87.45(7)
		Cl(4)#1-Pb(1)-Cl(1)	95.09(7)
		Cl(3)-Pb(1)-Cl(1)#2	81.19(7)
		Cl(4)-Pb(1)-Cl(1)#2	90.02(6)
		Cl(4)#1-Pb(1)-Cl(1)#2	87.24(6)
		Cl(1)-Pb(1)-Cl(1)#2	95.13 (11)

Symmetry transformations used to generate equivalent atoms: #1 x-1, y, z #2 -x, y-1/2, -z+1/2