Supporting Information

Temperature dependence of radiative and non-radiative decay in the luminescence of one-dimensional pyridinium lead halide hybrids

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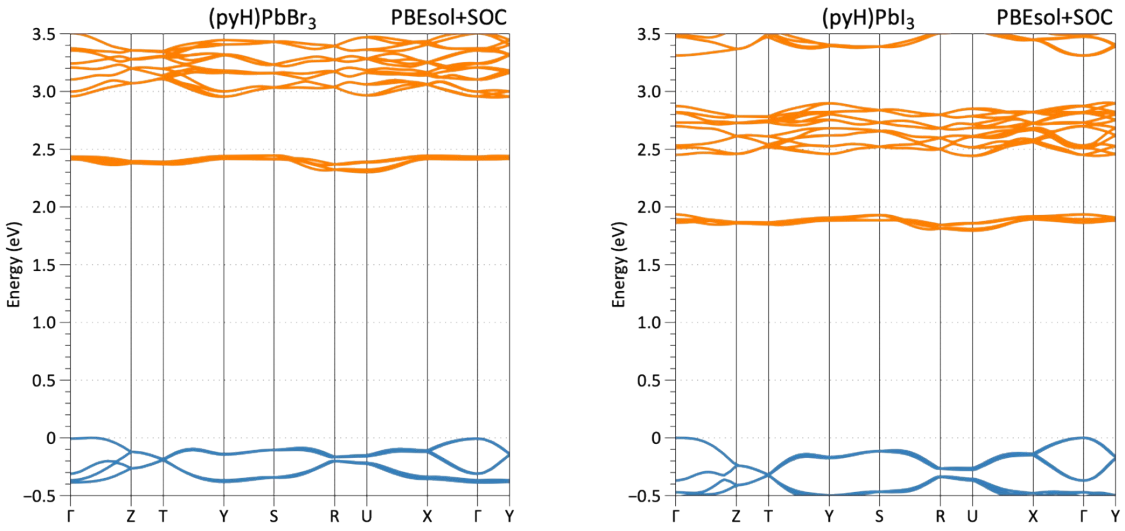

Figure S1. Band structures calculated for (pyH)$PbBr_3$ and (pyH)PbI_3.

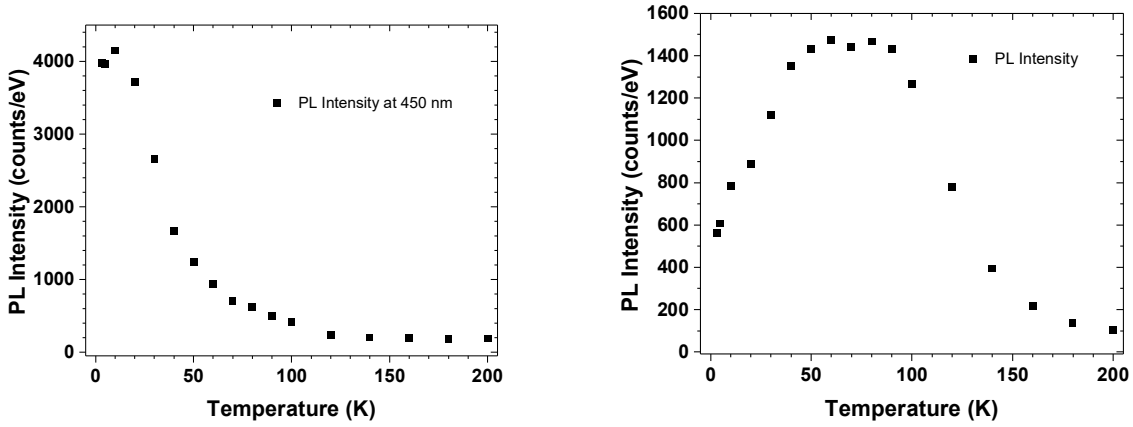

Figure S2. Temperature dependence of the integrated luminescence intensity for (pyH)$PbBr_3$ for emission bands at high (left) and low (right) energy.

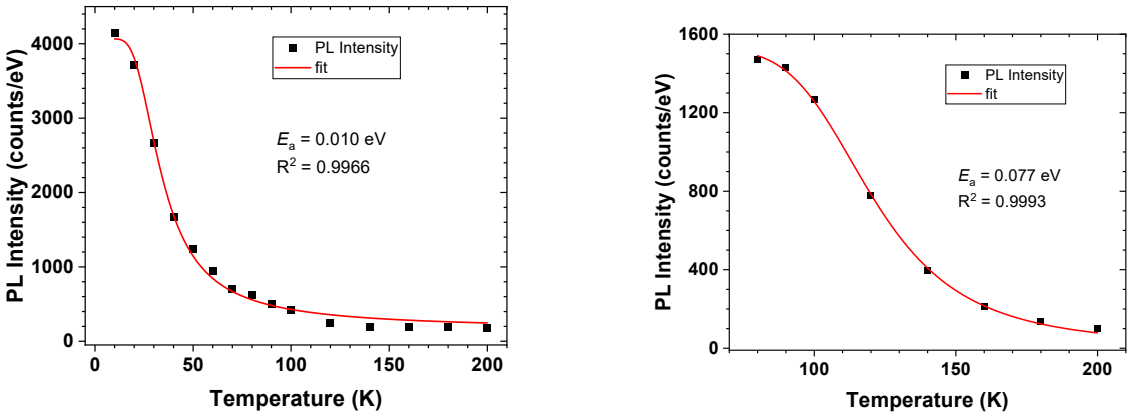

Figure S3. Arrhenius fit to the temperature dependence for the low (left) and high (right) energy luminescence from (pyH)$PbBr_3$.

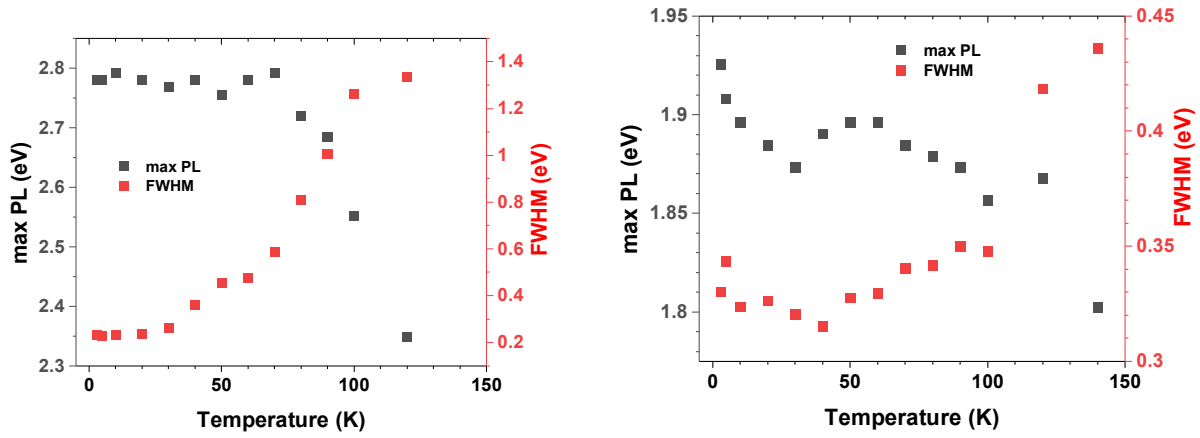

Figure S4. Temperature dependence of the luminescence peak maxima and linewidth at high energy (left) and low energy (right) for (pyH)$PbBr_3$.

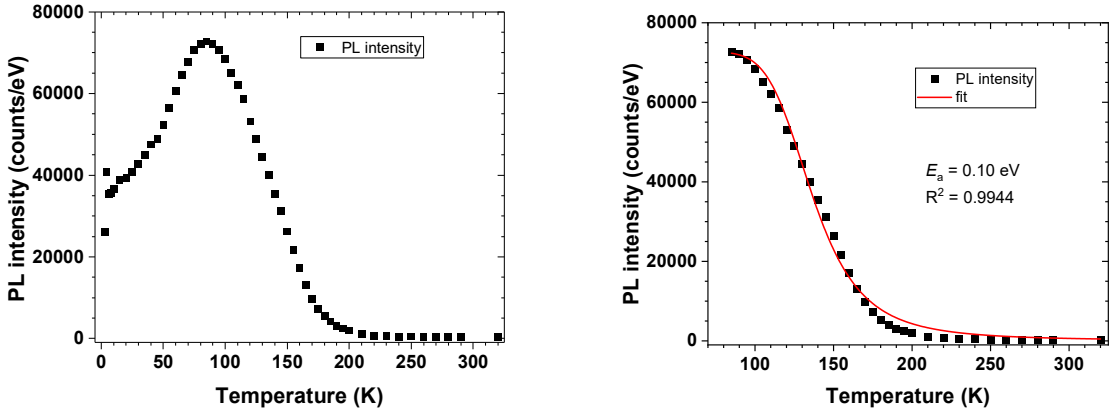

Figure S5. Temperature dependence of integrated emission intensity (left) and Arrhenius fit to the temperature dependence for the luminescence from (pyH)PbI_3 for T > 80 K (right).

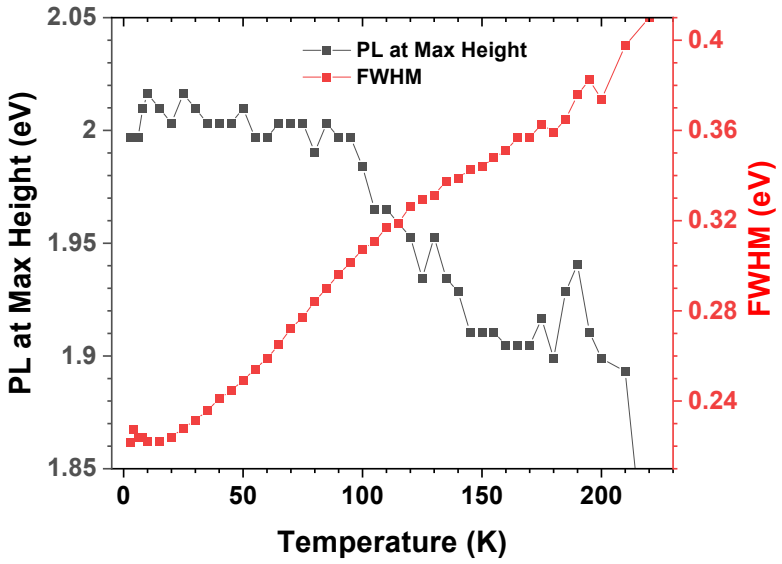

Figure S6. Temperature dependence of the luminescence peak maxima and linewidth for (pyH)PbI_3.

Table S1. Powder X-ray data collection parameters for (pyH)$PbBr_3$ and (pyH)PbI_3.

Compound	(pyH)PbI_3	(pyH)$PbBr_3$
Chemical formula	$C_5N_1H_6Pb_1I_3$	$C_5N_1H_6Pb_1Br_3$
Space group	$Pnma$ (#62)	$Pnma$ (#62)
a (Å)	14.9839(8)	14.348(6)
b (Å)	8.1067(4)	7.740(3)
c (Å)	9.9103(7)	9.474(5)
Volume (Å^3)	1203.8	1052.1
Z	4	
Source	Cu K_α radiation	
Wavelength	1.5406 / 1.5444 Å	
Collection temperature	295 K	
Step size (° 2θ)	0.015	
Time per step (sec)	2.0	
Angular range (° 2θ)	5–100	
R_{wp}	5.799 (Rietveld)	7.510 (WPPF)

Table S2. Fit parameters for luminescence power dependence data from (pyH)PbI_3 and reference material, aluminum quinolate (AlQ_3).

	n (low power)	*a* (low power)	*n* (high power)	*a* (high power)
(pyH)PbI_3, 77 K	0.90	1.9 x 10^5	1.30	2.6 x 10^5
(pyH)PbI_3, 3.1 K	0.67	1.5 x 10^5	1.50	2.0 x 10^5
AlQ_3, 300 K	--	--	0.97	4.3 x 10^5

$fit = a \cdot x^n$