Supporting Information

Unveiling the ultralow in-plane thermal conductivity in 2D organic-inorganic hybrid perovskite $(EA)_2PbI_4$ single crystal

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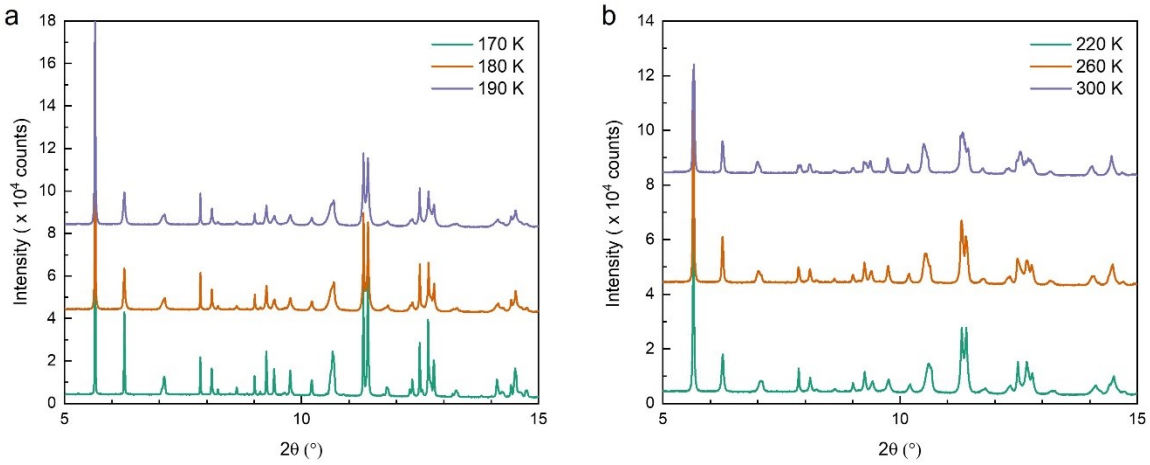

Fig. S1. The synchrotron powder XRD patterns of EA_2PbI_4, recorded at (a) 170 K, 180 K, and 190 K (b) 220 K, 260 K, and 300 K.

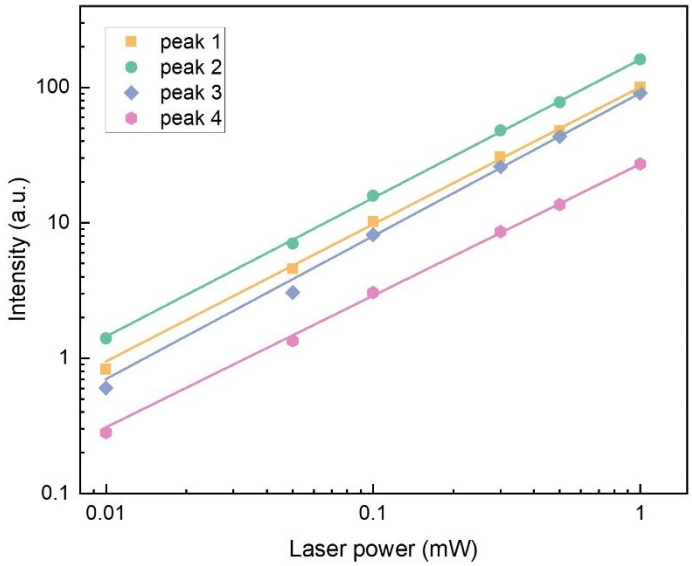

Fig. S2. Power dependence of photoluminescence (PL) peaks measured at 15 K. The intensities of the four PL peaks (I_{PL}) follow the relationship $I_{PL} \propto P^n$, with n values of 1.01, 1.02, 1.05, and 0.97 for peaks 1 through 4, respectively.

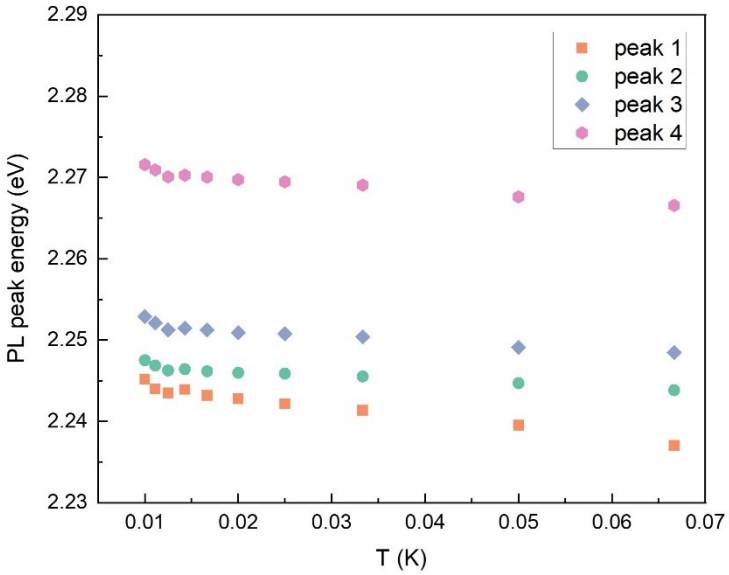

Fig. S3. The PL peak energies of the four peaks of EA_2PbI_4 plotted as a function of $1/T$.

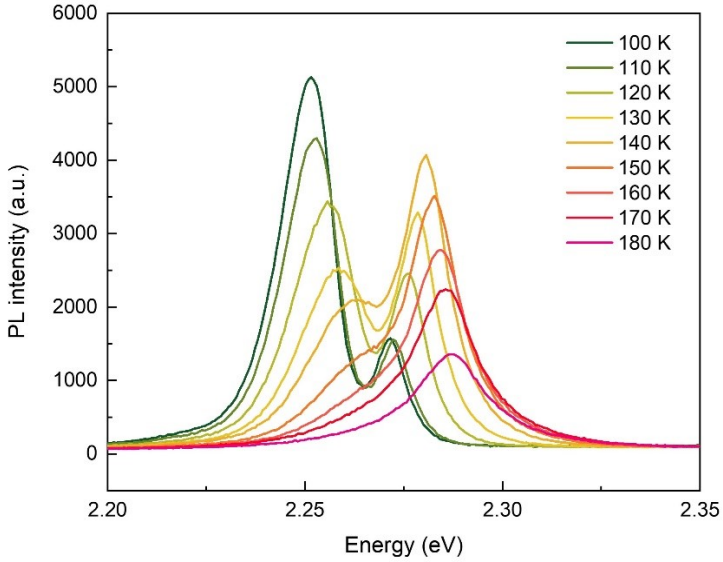

Fig. S4. Temperature-dependent evolution of PL peaks of EA_2PbI_4 within the range of 100 K to 180 K, illustrating the shift and merging of peaks.