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

SUPPORTING INFORMATION

High quality $MAPbBr_3$ films via pulsed laser deposition of single-crystalline targets

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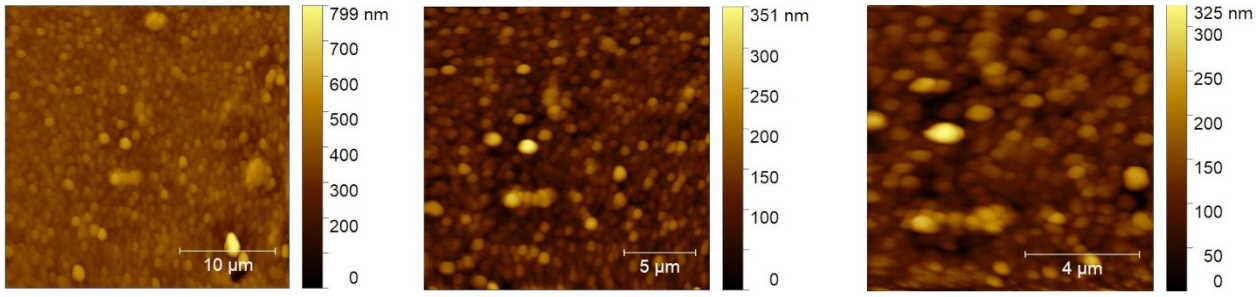

Figure S1. AFM images: from the left images 30*30µm, 20*20 µm and 10*10 µm respectively.

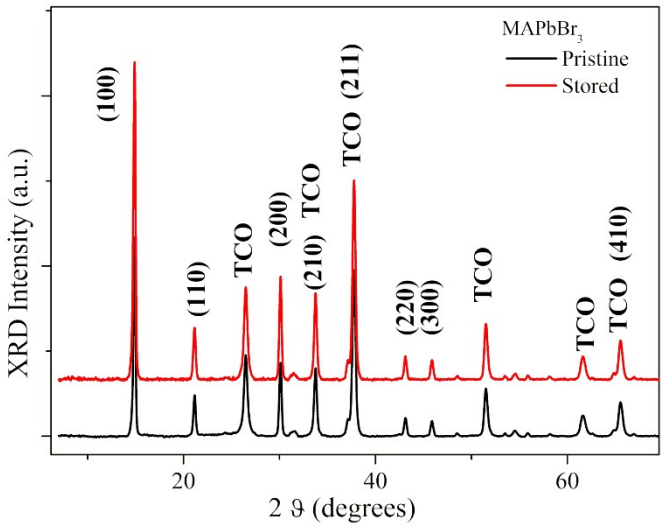

Figure S2. XRD comparison of pristine $MAPbBr_3$ sample and after storage.

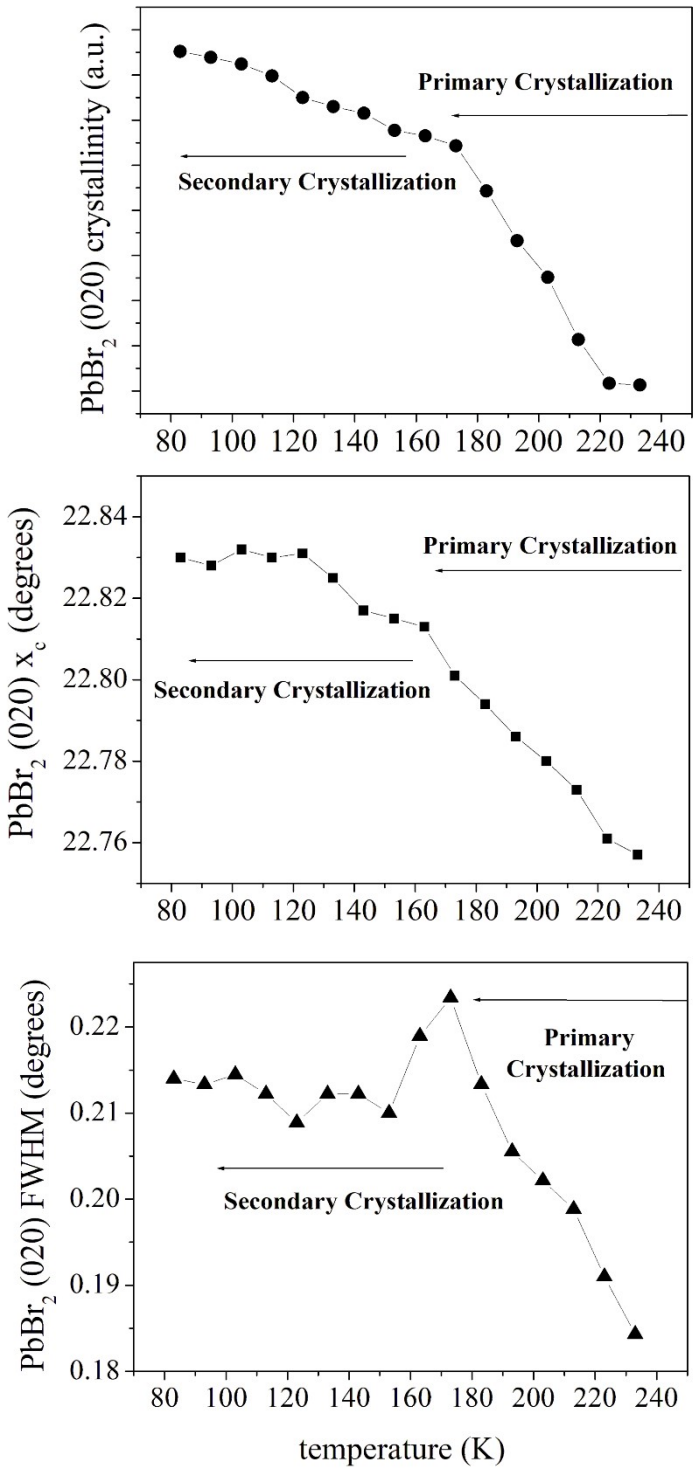

Figure S3. Temperature dependent crystallographic evolution of the $PbBr_2$ product.

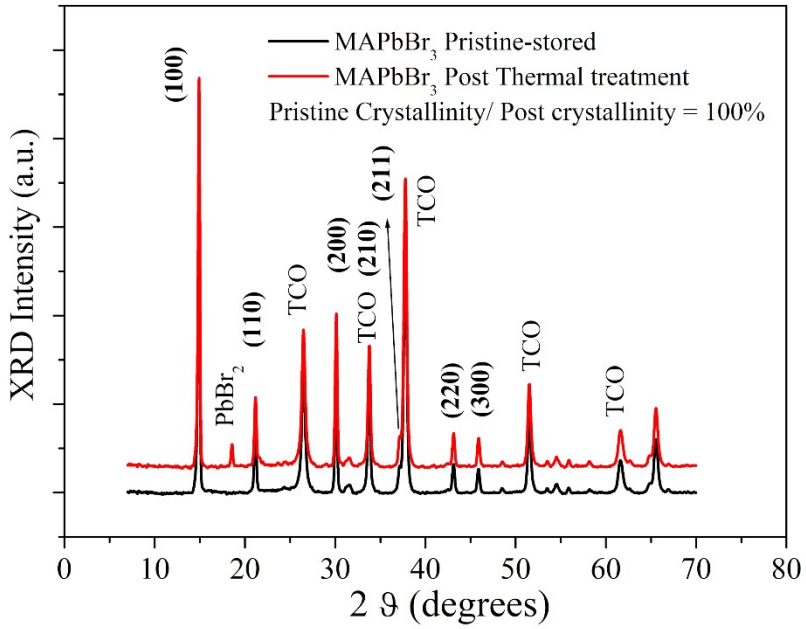

Figure S4. XRD comparison of pristine-stored and post thermal treatment $MAPbBr_3$ sample.

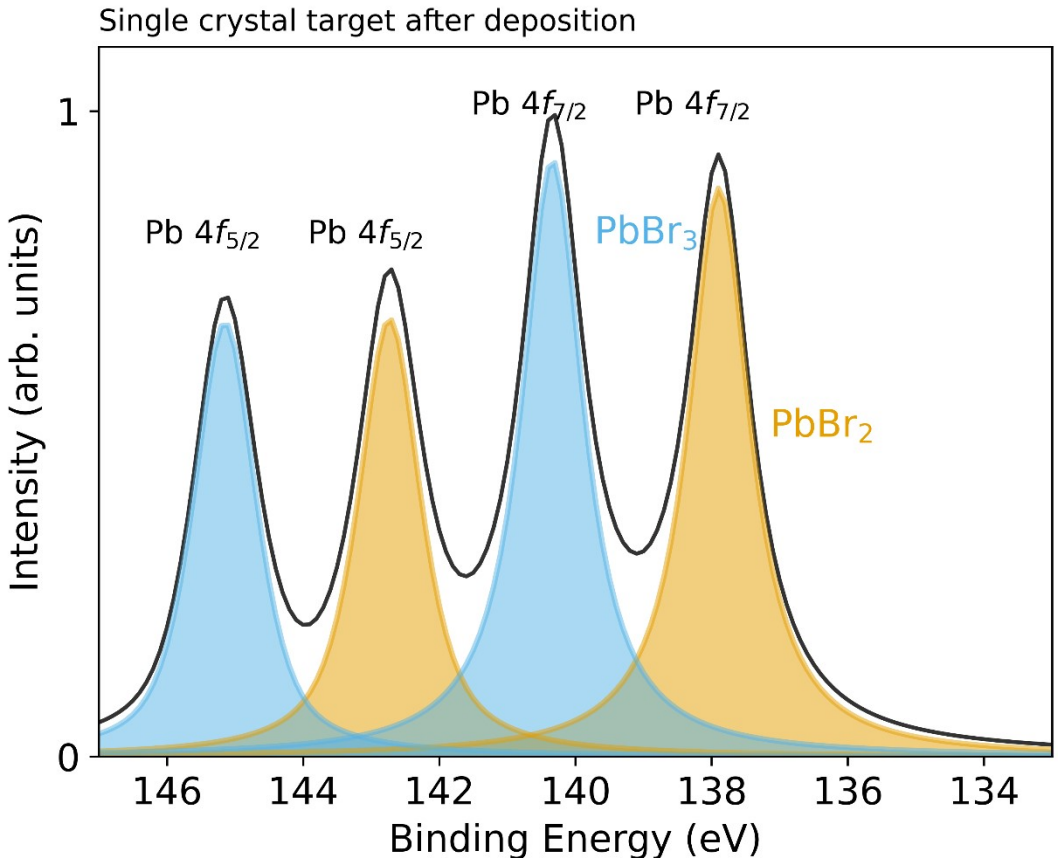

Fig. S5. XPS spectrum of the single crystal target after some depositions. The spectra show the presence of $PbBr_2$ and $PbBr_3$ phases on the sample surface. Four peaks were used to fit the spectra corresponding to Pb 4f electrons of the $PbBr_2$ and $PbBr_3$ phase.

Table S1. Fitting parameters of Pb 4d spectra of the sample substrate (crystal) film including the peak position, full width at half maximum (FWHM) and the relative contributions of Pb 5/2 and Pb 7/2. The contribution is calculated taking both $PbBr_2$ and $PbBr_3$ phases.

		Pb 4f 5/2	**Pb 4f 7/2**
Center (eV)	$PbBr_2$	142.7	137.9
Fwhm (eV)		1.1	1.1
Contribution (%)		20.8	29.3
Center (eV)	$PbBr_3$	145.1	140.3
Fwhm (eV)		1.1	1.1
Contribution (%)		19.3	30.6

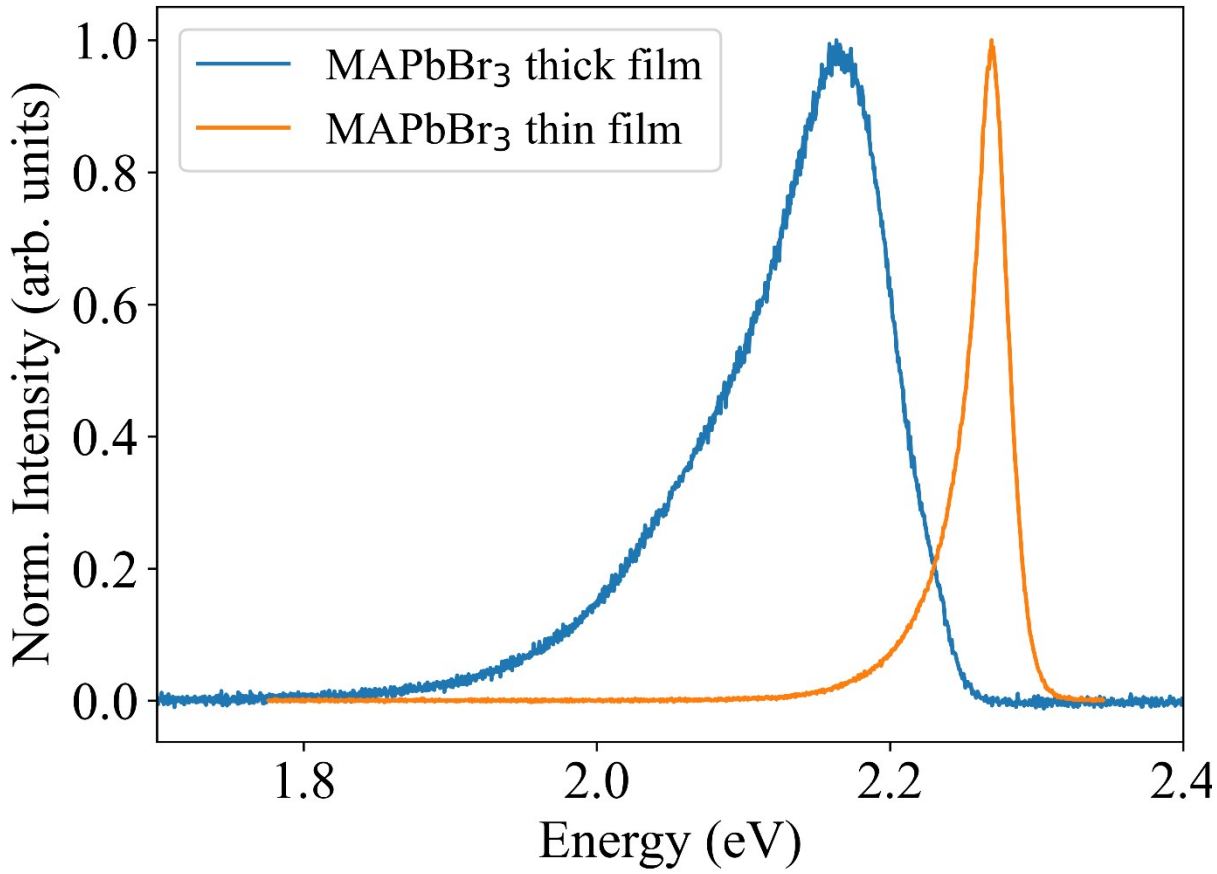

Figure S6. PL spectra at 12 K of thin (100 nm) and thick films grown from single crystal target.

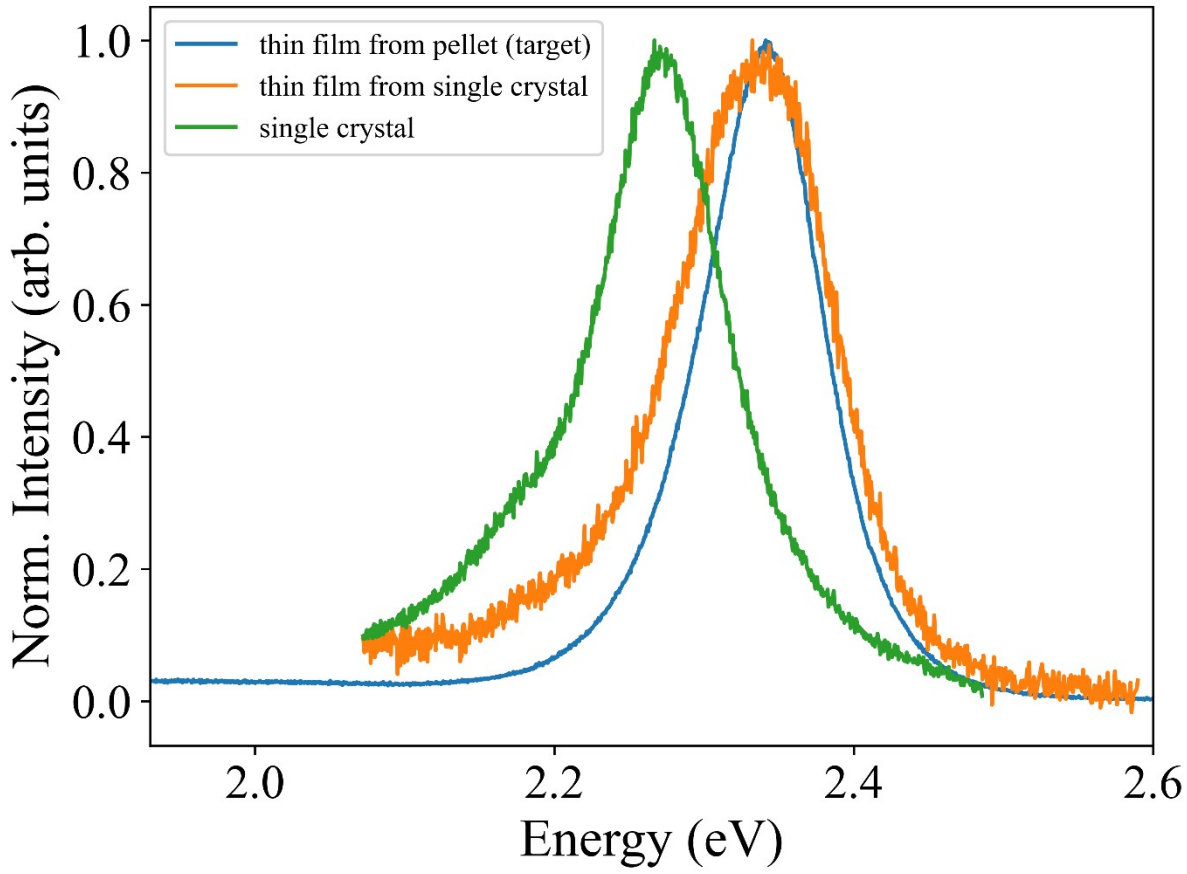

Figure S7. PL spectra at 300K of a thin film grown from a single crystal target (brown line) and from a pellet sintered from pressed powders (blue). The green line represents the spectrum of the single crystal used as PLD target