

## Supplementary Information

### Thermal Stability and Decomposition Kinetics of Mixed-Cation Halide Perovskites

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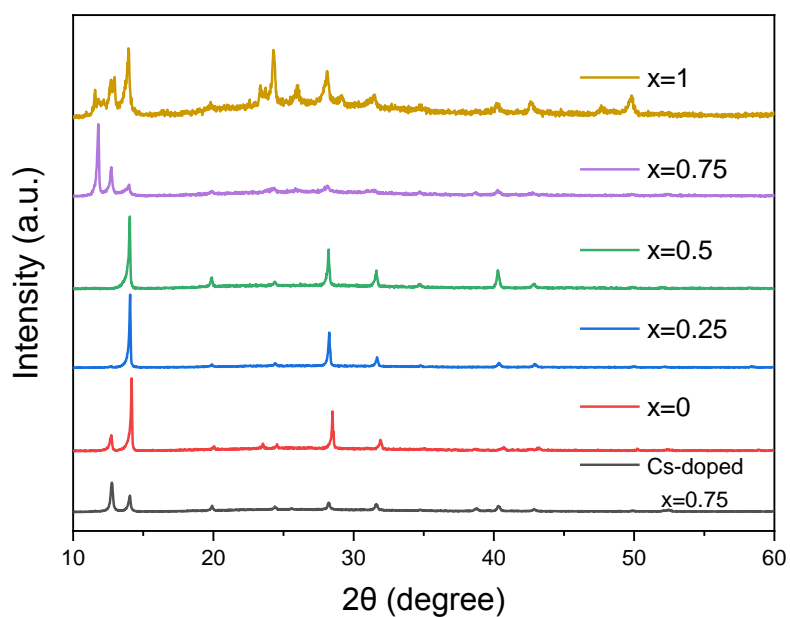
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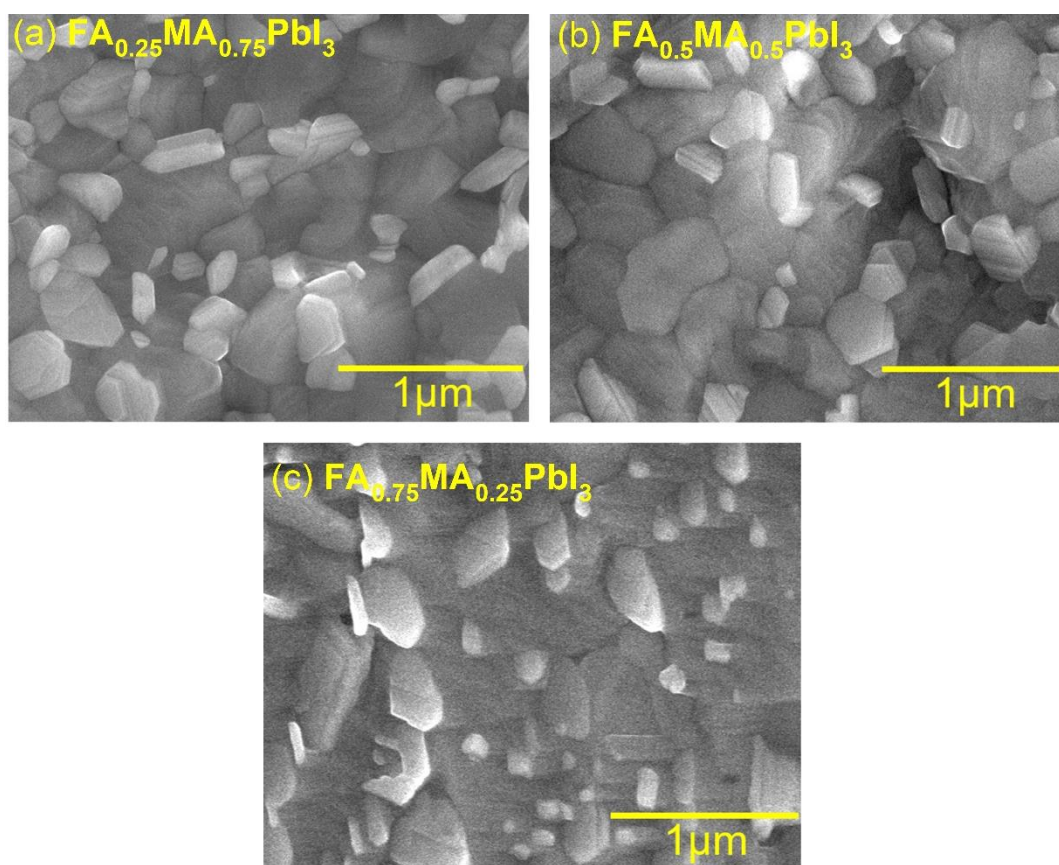
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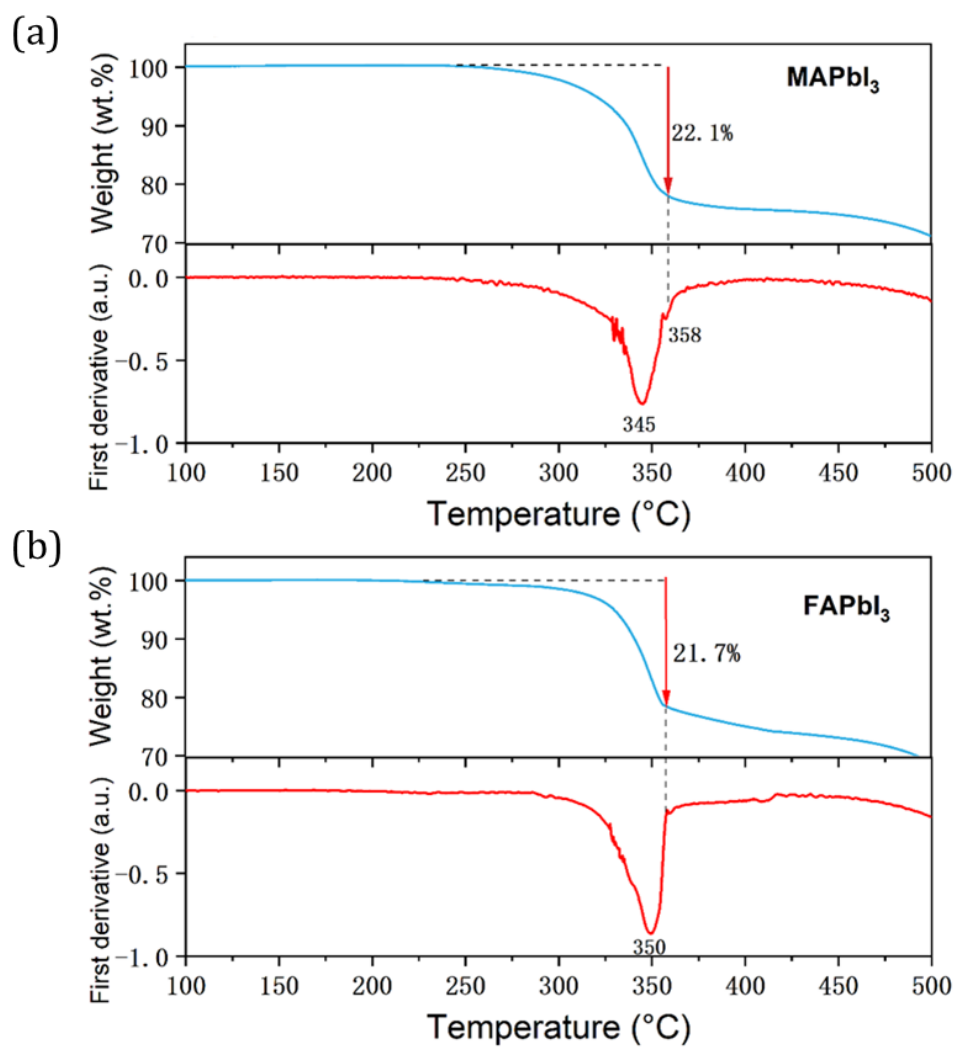
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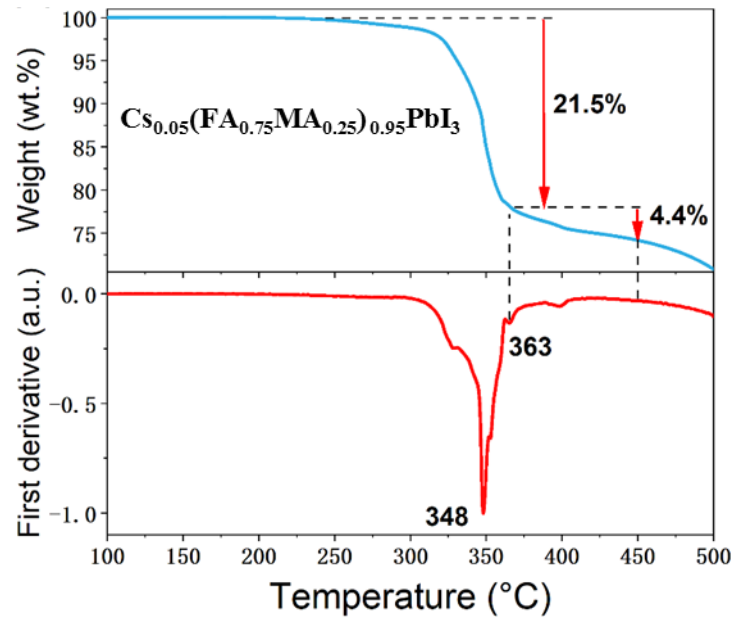
**Figure S1.** X-ray diffraction patterns for  $\text{FA}_x\text{MA}_{1-x}\text{PbI}_3$  ( $x=0, 0.25, 0.5, 0.75, 1$ ) and Cs-doped perovskite  $\text{Cs}_{0.05}(\text{FA}_{0.75}\text{MA}_{0.25})_{0.95}\text{PbI}_3$  films.



**Figure S2.** Scanning Electron Microscope images for (a)  $\text{FA}_{0.25}\text{MA}_{0.75}\text{PbI}_3$ , (b)  $\text{FA}_{0.5}\text{MA}_{0.5}\text{PbI}_3$  and (c)  $\text{FA}_{0.75}\text{MA}_{0.25}\text{PbI}_3$  perovskite films.



**Figure S3.** TGA and the first derivative of TGA curves for (a) MAPbI<sub>3</sub> and (b) FAPbI<sub>3</sub> at heating rate of 10 °C min<sup>-1</sup> in nitrogen.



**Figure S4.** TGA and the first derivative of TGA curves at heating rate of  $10\text{ }^{\circ}\text{C min}^{-1}$  in nitrogen for  $\text{Cs}_{0.05}(\text{FA}_{0.75}\text{MA}_{0.25})_{0.95}\text{PbI}_3$ .