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Supporting Information for

High-quality blade-coated $CH_3NH_3PbI_3$ perovskite thick films for high-performance X-ray detection

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Experimental

Microcrystals in the comparative experiment were directly synthesized by a simple antisolvent method. Specially speaking, firstly, MAI and PbI_2 in equimolar ratios were placed in a glass bottle and prepared into a 1.2 M precursor solution by adding GBL solution. The solution was stirred at 60 ℃ until clear. Then, an appropriate amount of anti-solvent trichloromethane ($CHCl_3$) was quickly added to the clarified solution, and the black precipitation will precipitate quickly in the solution. Finally, after three centrifuges and $CHCl_3$ washing, the black precipitate was dried in an oven at 60 ℃ for 12 h to obtain $MAPbI_3$ microcrystals. Subsequently, the comparison $MAPbI_3$ polycrystalline thick films and the comparison X-ray detector with a structure of ITO/$MAPbI_3$ thick film/carbon electrode were prepared using the same method as our case.

Supplementary Figures：

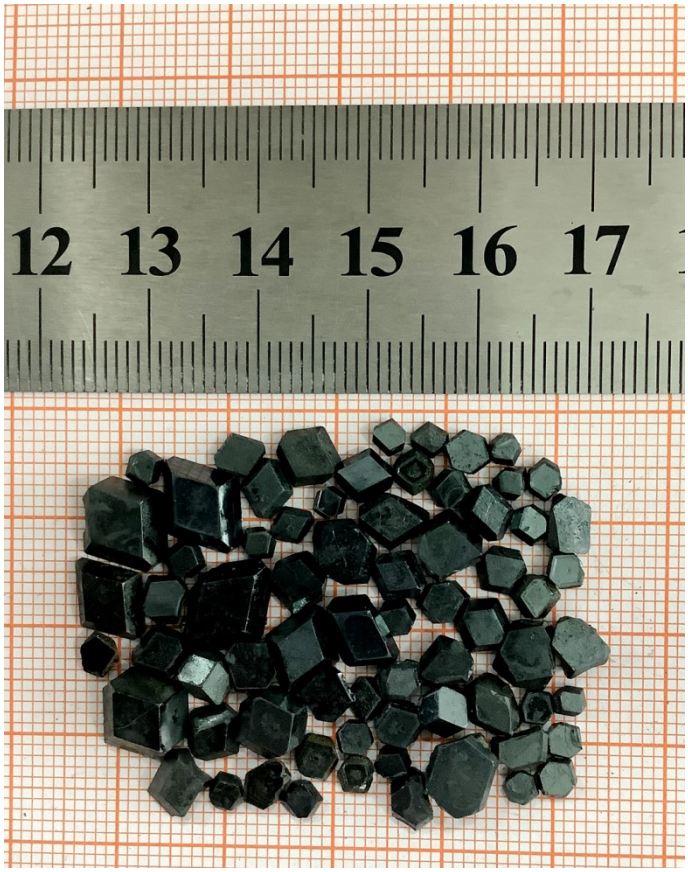

Figure S1. Photograph of the small-sized $MAPbI_3$ single crystals.

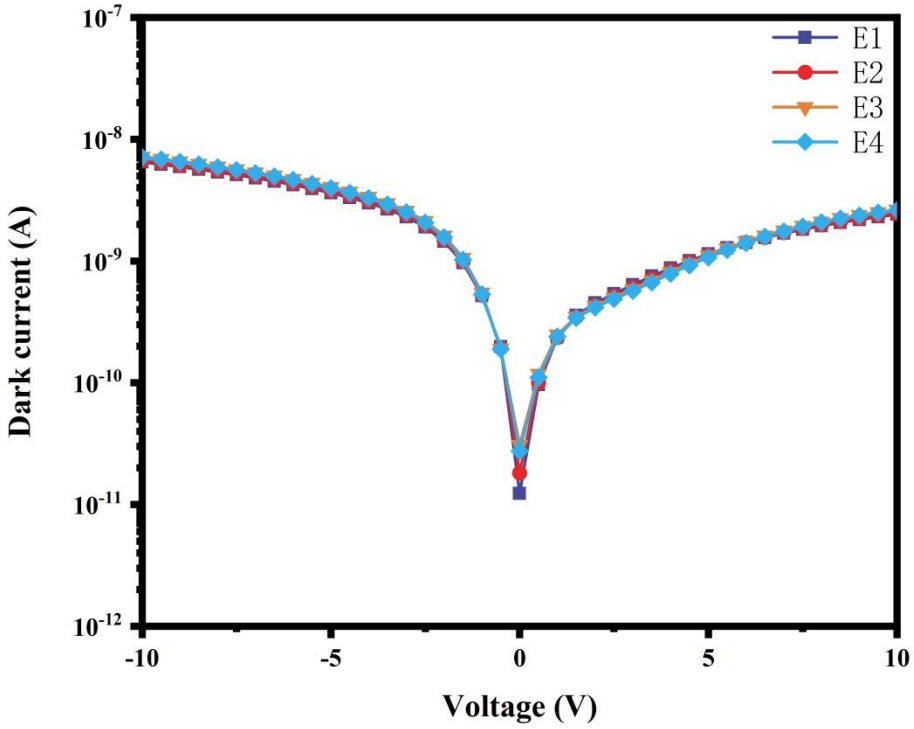

Figure S2. Dark current curves of the device at each electrode.

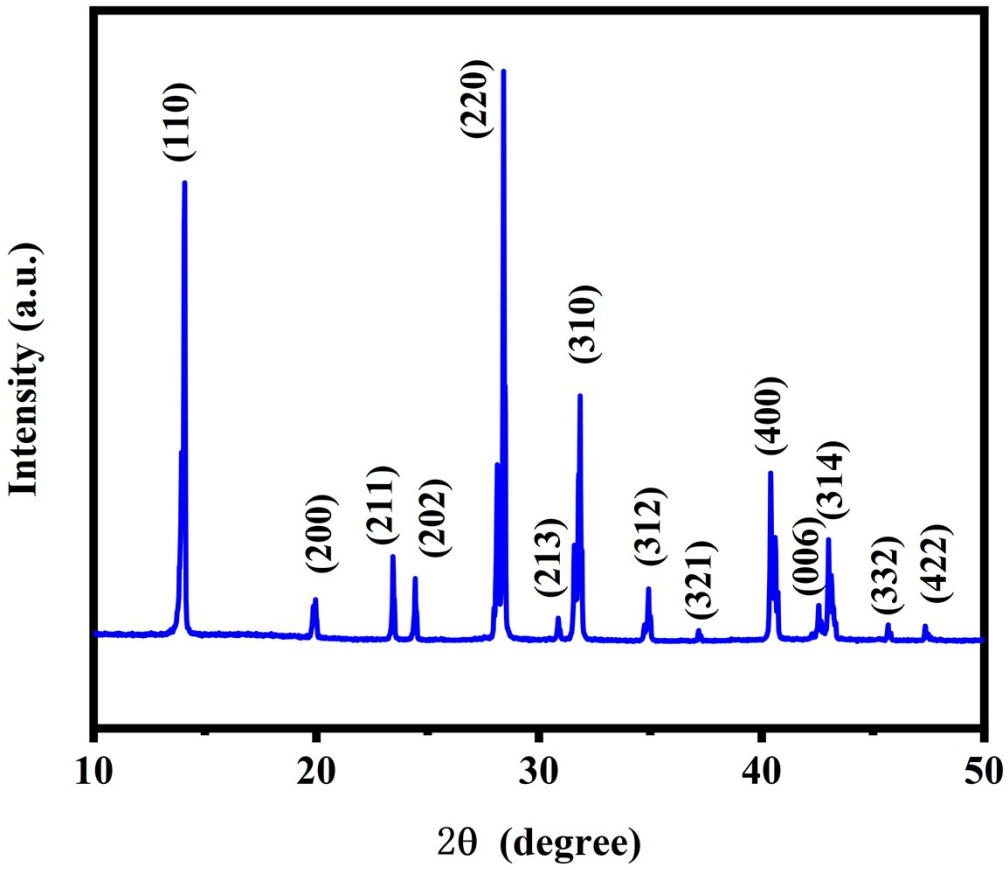

Figure S3. XRD patterns of $MAPbI_3$ thick film.

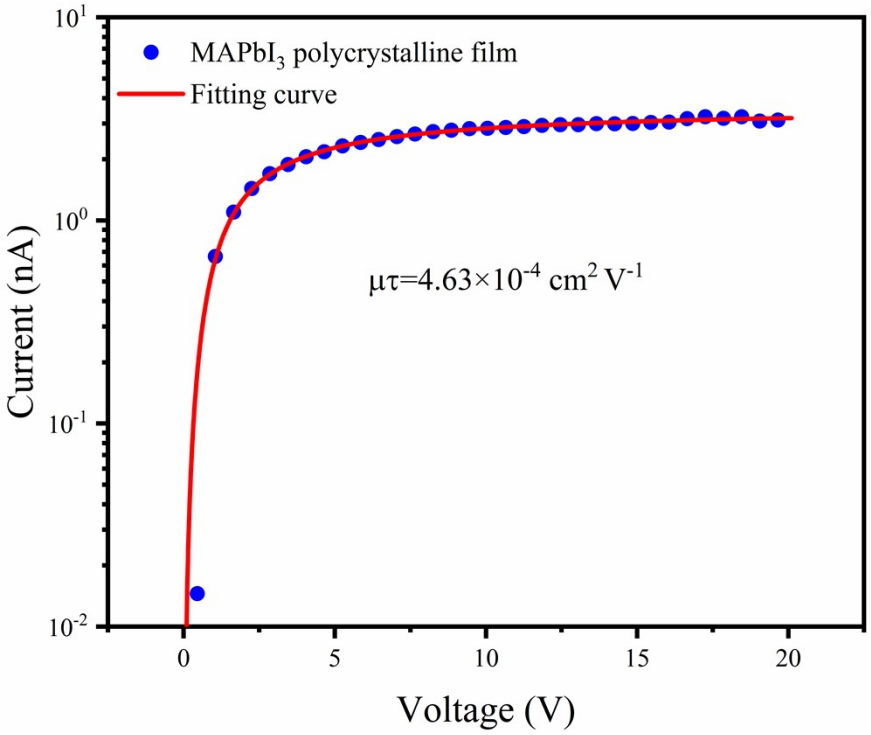

Figure S4. I-V characteristic curve of the comparison detector under X-ray irradiation.

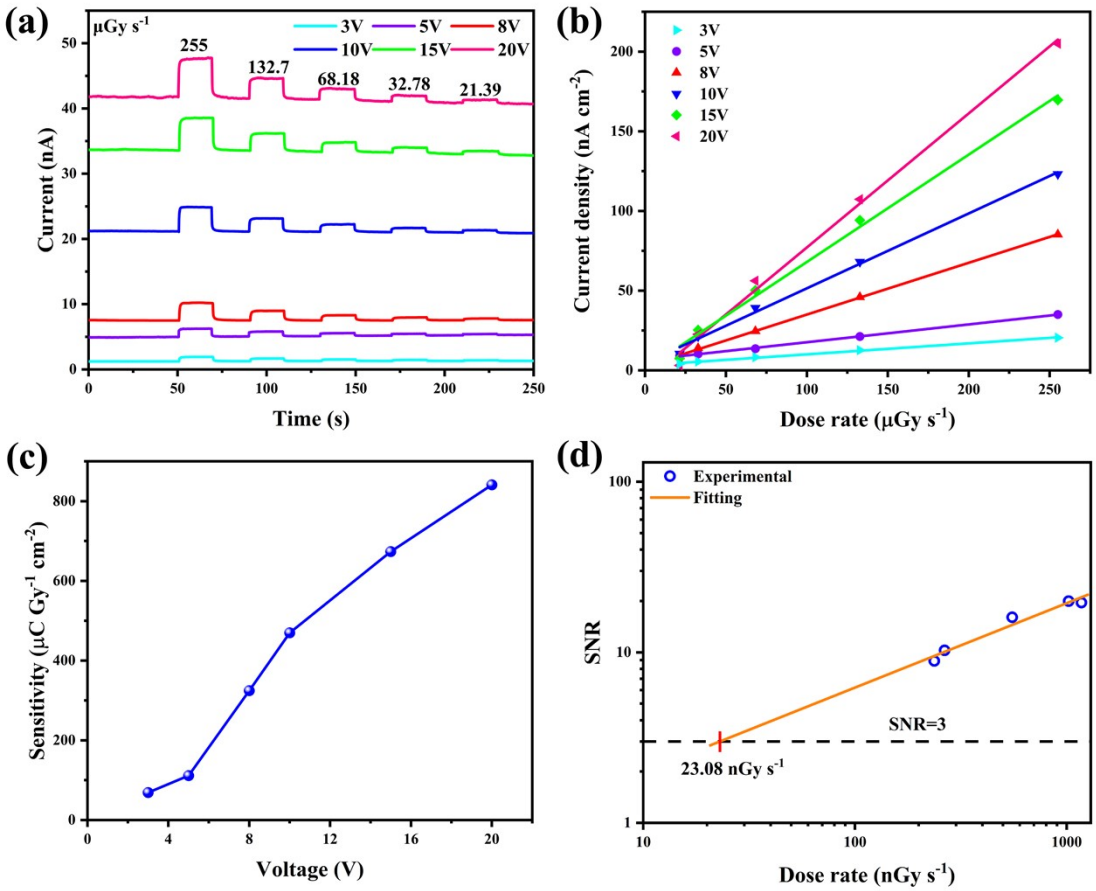

Figure S5. (a) X-ray response currents of the comparison detector were tested at different biases. (b) Photocurrent density of the comparison detector generated at different X-ray dose rates under various biases. (c) Sensitivity of the comparison detector generated at different X-ray dose rates under various biases. (d) The SNR of the comparison detector under different dose rates at 10 V bias.

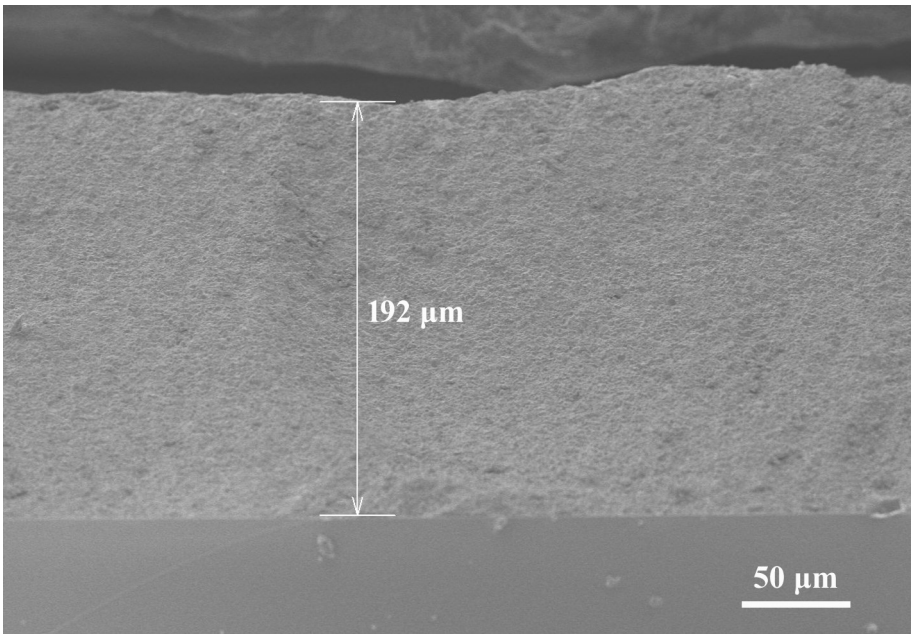

Figure S6. Cross-section of the comparison $MAPbI_3$ polycrystalline thick film