Supporting information for

Scintillation Performance of Two-dimensional Perovskite $(BA)_2PbBr_4$ Microcrystals

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Experimental Section：

Chemicals: Butylammonium Bromide (BABr), lead bromide (PbBr2) and dimethylformamide (DMF) were purchased from Aladdin. All the chemicals were used without further purification.

Characterization:

Powder X-ray diffraction pattern was characterized by using a diffractometer (Bruker, D8 ADVANCE) equipped with Cu Kα radiation. High-resolution transmission electron microscopy (HRTEM) image was recorded on a transmission electron microscope (JEM 2100) operating at an acceleration voltage of 200 kV. The optical transmission and absorption spectrum were carried out using an UV–vis spectrophotometer (Shimadzu, UV3600 plus). Photoluminescence spectrum measurements were collected using an Edinburgh FLS1000 fluorescence spectrometer and excited at a wavelength of 365 nm using a xenon lamp source. Time-resolved photoluminescence spectrum was performed on an Edinburgh FLS1000 fluorescence spectrometer with a 365 nm

picosecond pulsed diode laser. RL spectrum measurements were carried out with an X-ray tube (12 W X-ray source manufactured by Moxtek Inc.) at 30 kV and a spectrometer (Newport 74126). Dose-dependent RL spectra were recorded by a spectrometer. The dose rate of X-ray was altered by changing the current and read out by an ion chamber dosimeter. Decay time was performed by the self-build time-correlated single-photon counting (TCSPC) system which includes a PMT (ET Enterprises Limited-9815), a microchannel plate (MCP, R3809U-52), a time-to-amplitude converter (TAC, ORTEC 567), a constant-fraction discriminator (ORTEC 935), a timing discriminator (ORTEC 9327), a delay unit (ORTEC, 425) and a computer-controlled multichannel analyzer (Amptek, MCA8000A). The pulse height spectrum system consists of a PMT (HAMAMATSU, R6231-100), scintillation preamplifier (ORTEC, 113), spectroscopy amplifier (ORTEC, 672) and multi-channel (Amptek, MCA8000A). To obtain the calculated XRD patterns of $(BA)_2PbBr_4$, the crystal data we used are from the literature. [1]

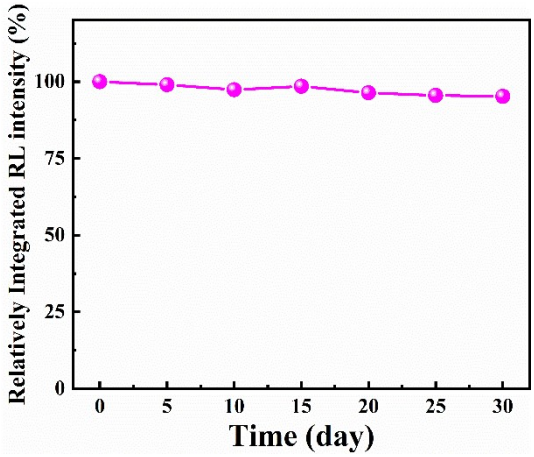

Figure S1. Long-term stability of RL intensity of BA2PbBr4 microcrystals which are put in air (50% relative humidity).

Reference

1 T. Sheikh and A. Nag, J. Phys. Chem. C 2019, 123, 9420–9427