Supporting Information

MOFs-triggered formation of $MAPbBr_3$@PbBr(OH) with enhanced stability

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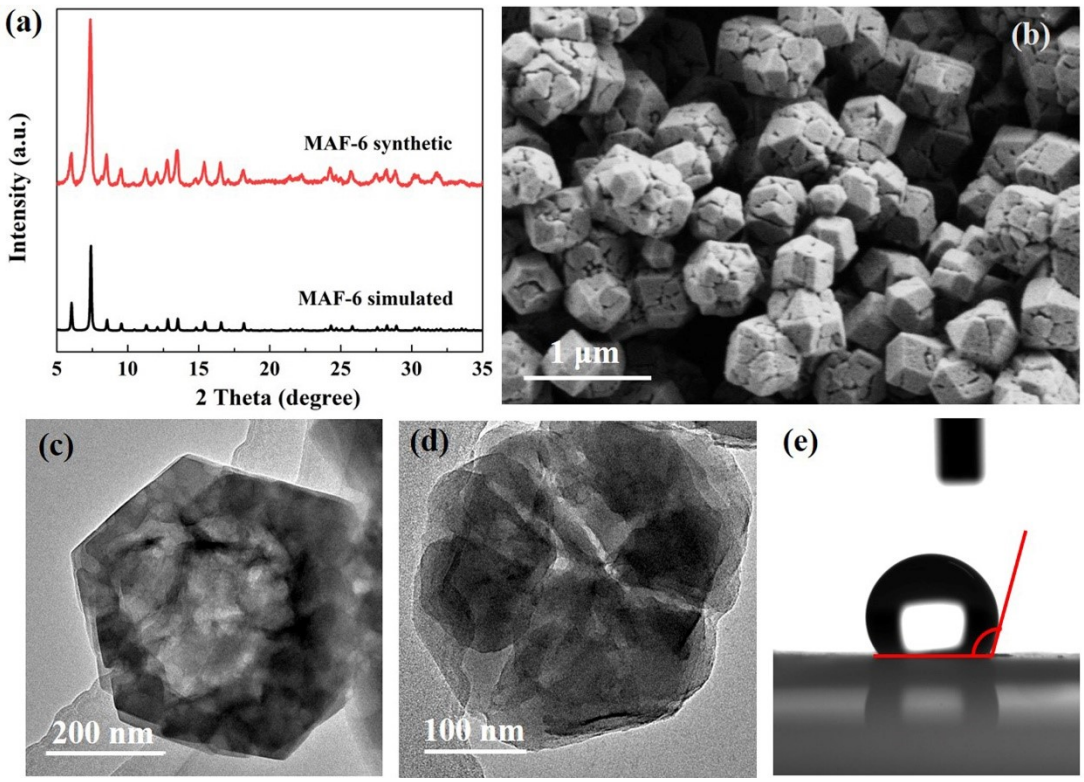

Fig. S1 XRD pattern (a), SEM image (b), TEM image (c and d) and contact angle image (e) of the synthesized MAF-6.

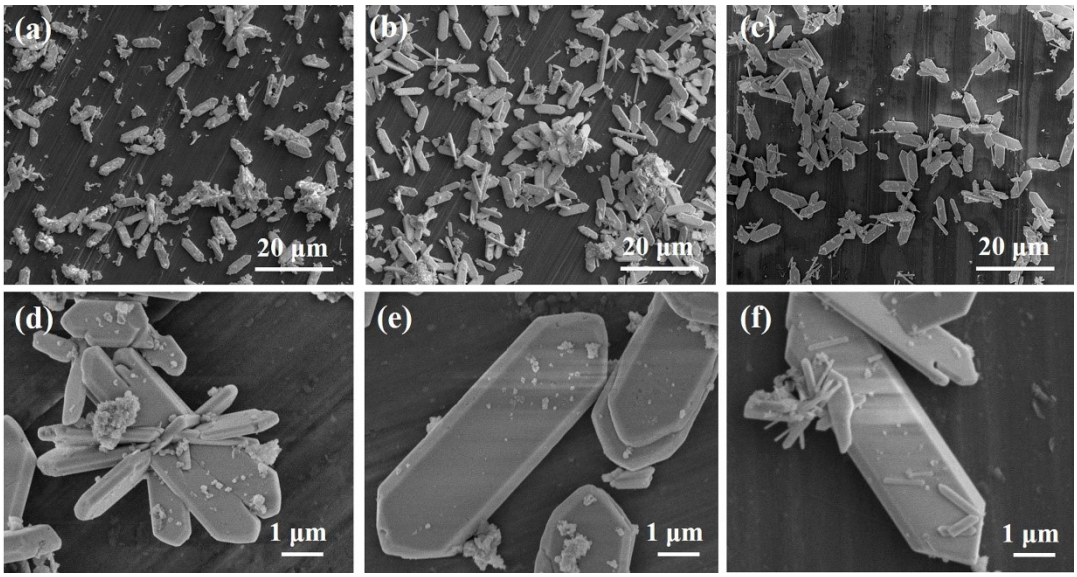

Fig. S2 SEM images of $MAPbBr_3$@PbBr(OH) composite powders washed with water/DMF once (a and d), twice (b and e) and three times (c and f).

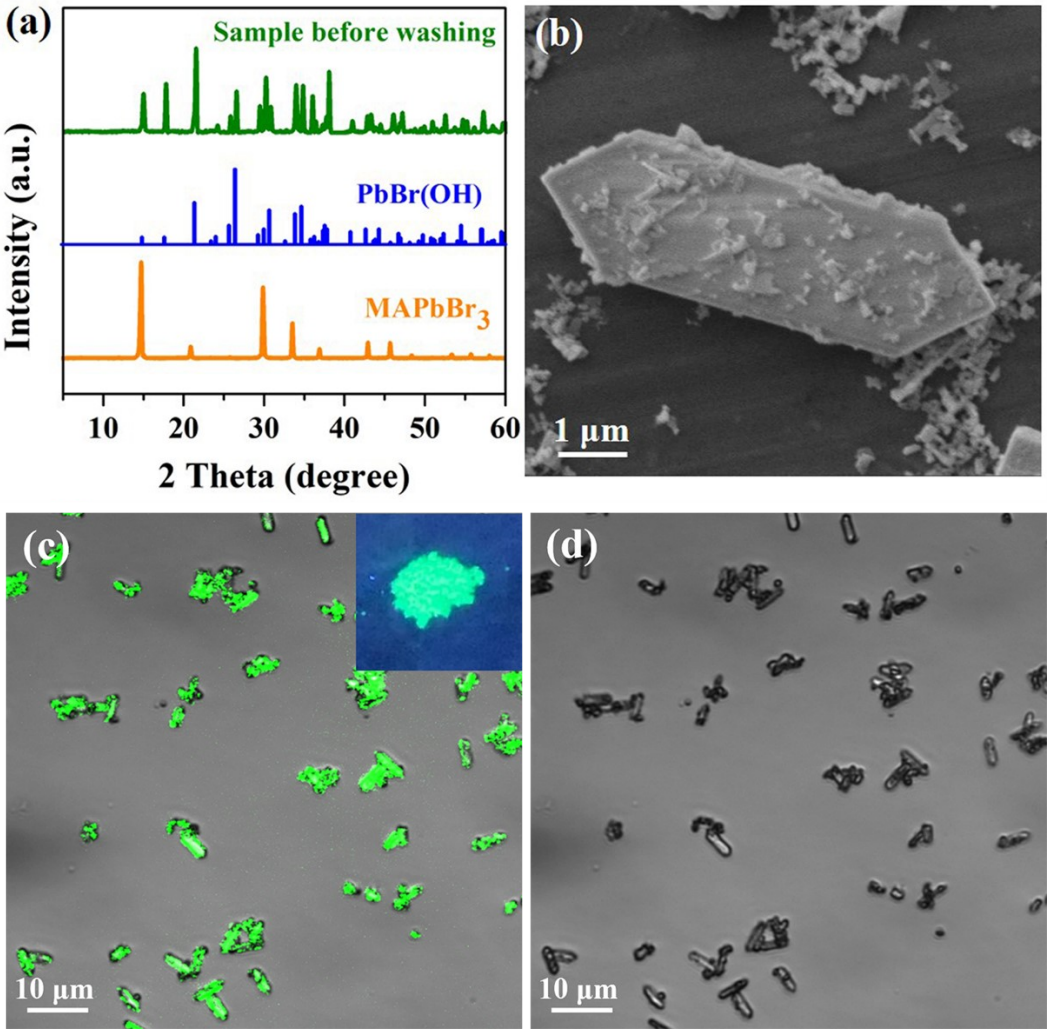

Fig. S3 XRD pattern (a) and SEM image (b) of the sample before washing. (c-d) Confocal fluorescence microscope image of the sample after washing with (c) and without (d) 405 nm laser irradiation (Inset is the photo of the sample after washing under a UV lamp).

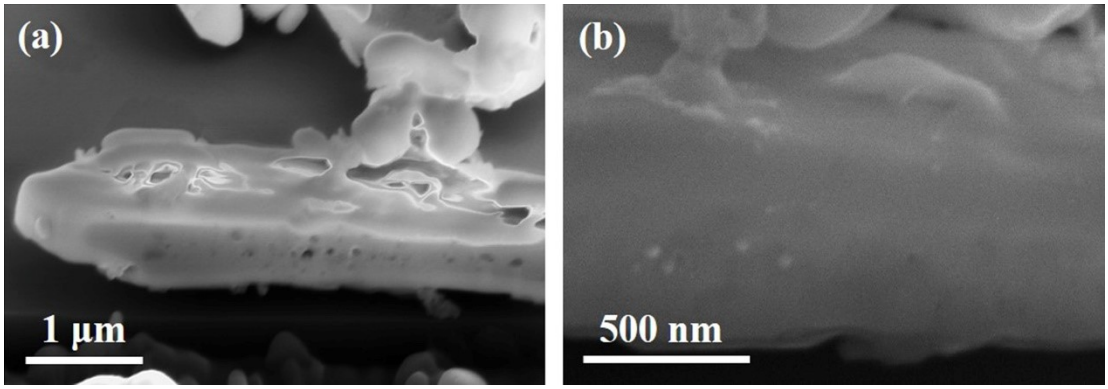

Fig. S4 (a) FIB-assisted cross-sectional SEM image of $MAPbBr_3$@PbBr(OH)

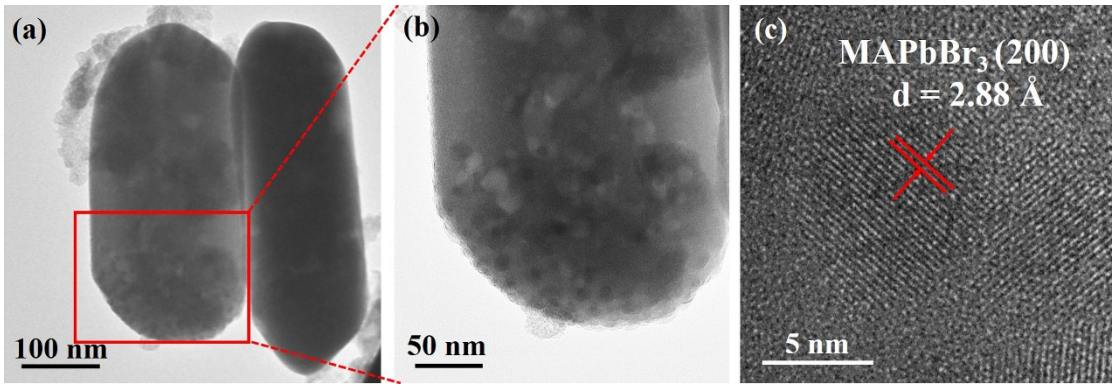

Fig.S5 TEM (a) and HR-TEM (b and c) images of $MAPbBr_3$@PbBr(OH)

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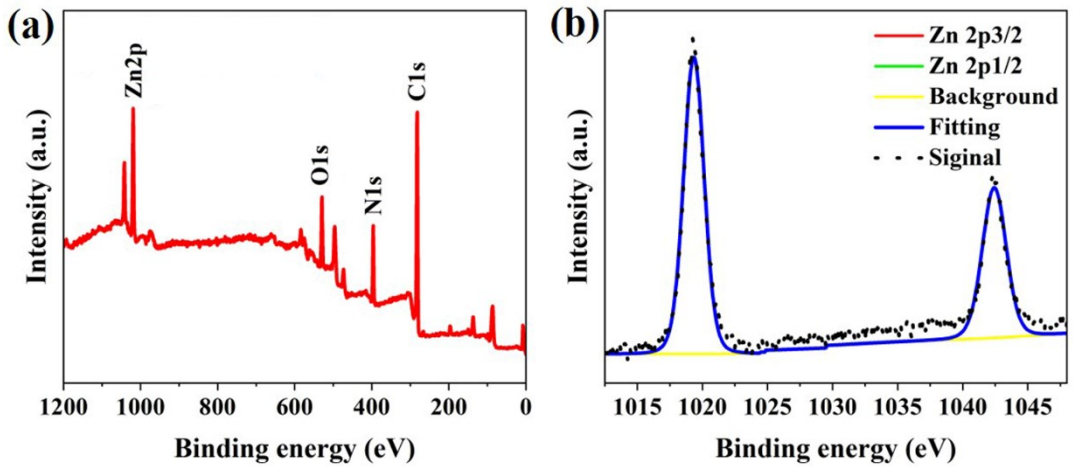

Fig. S6 XPS full spectrum (a) and Zn 2p spectrum (b) of MAF-6.

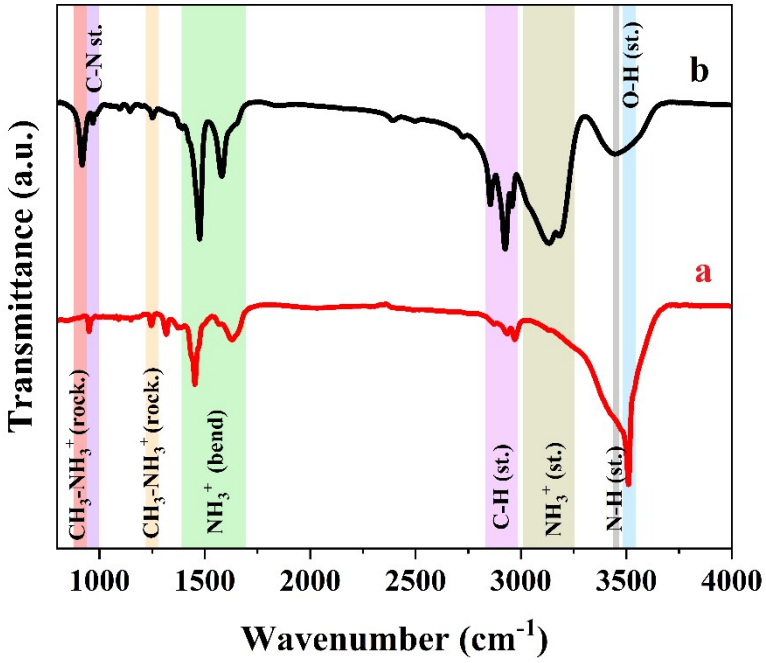

Fig. S7 FTIR spectra of $MAPbBr_3$@PbBr(OH) composite (a) and pure $MAPbBr_3$ (b).

Tab. S1. PL decay parameters of $MAPbBr_3$@PbBr(OH) composite and pure $MAPbBr_3$

Compounds	τ_1 (ns)	A_1	P_1 (%)	τ_2 (ns)	A_2	P_2 (%)	χ^2	τ_{av} (ns)
$MAPbBr_3$@PbBr(OH)	4.5	702.6	40.2	18.68	251.34	59.8	1.02	12.98
Pure $MAPbBr_3$	32.49	190.81	14.4	294.26	124.91	85.6	1.10	256.6

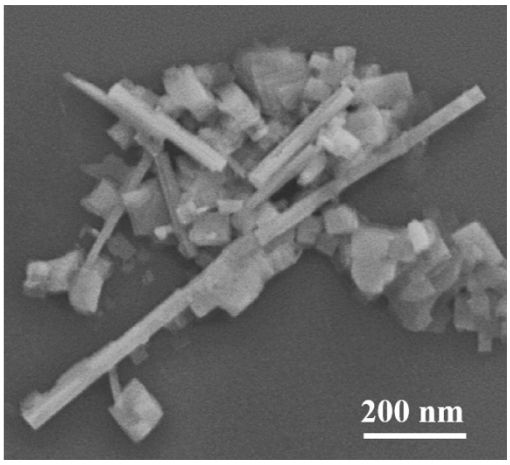

Fig. S8 SEM image of pure $MAPbBr_3$ synthesized without the aid of MOF

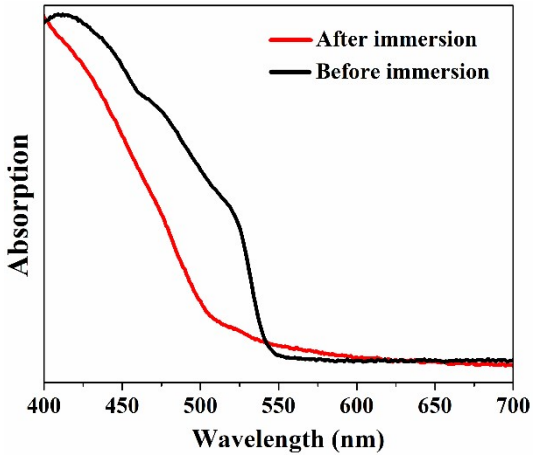

Fig. S9 UV-vis absorption spectra of $MAPbBr_3$@PbBr(OH) composite before and after immersion in DMF for 60 days.

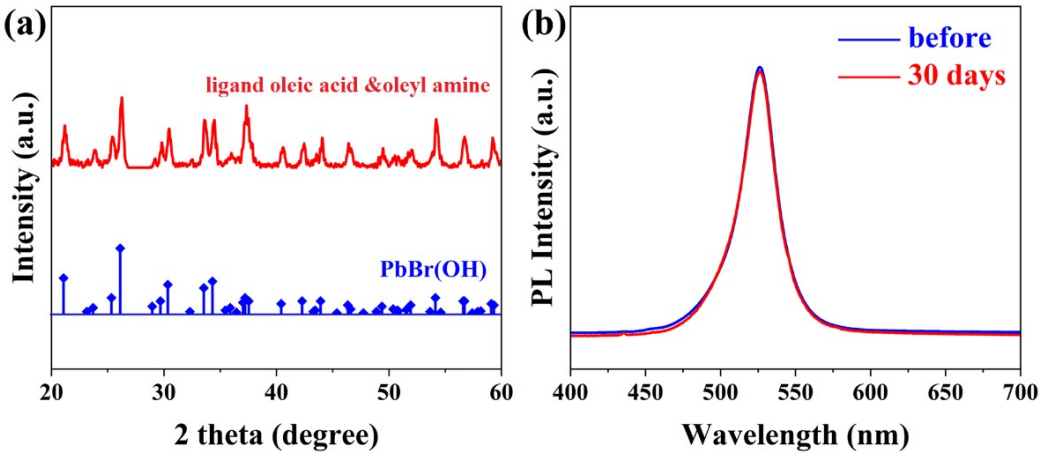

Fig. S10 (a) XRD pattern of $MAPbBr_3$@PbBr(OH) prepared from oleic acid and oleyl amine as surface ligands. (b) PL spectra of the prepared composite before and after immersion in DMF for 30 days.

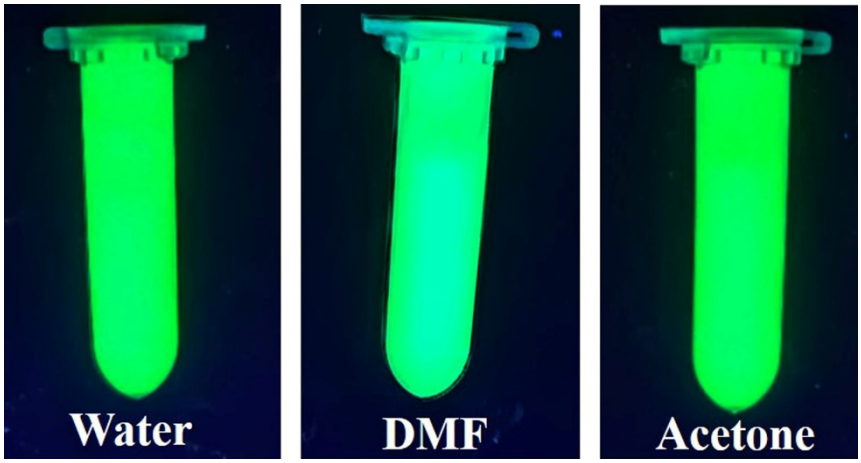

Fig. S11 Photos of $MAPbBr_3$@PbBr(OH) composite after immersion in different polar solvents for 60 days under UV light.

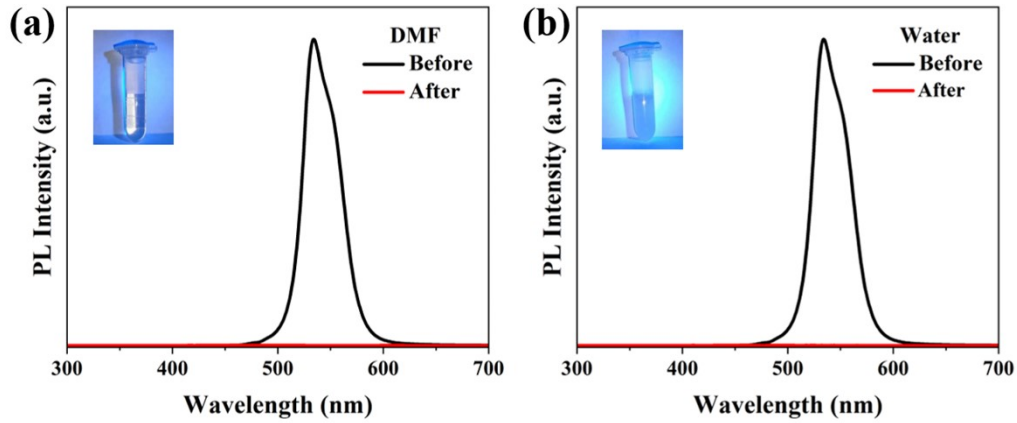

Fig. S12 PL spectra of pure $MAPbBr_3$ before and after immersion in DMF (a) and water (b) (Insets are the photos of pure $MAPbBr_3$ after washing under UV light).

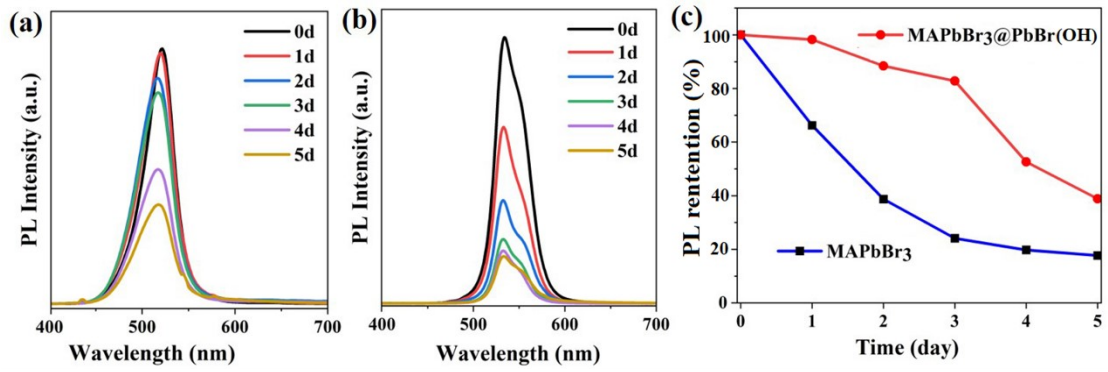

Fig. S13 PL spectra of $MAPbBr_3$@PbBr(OH) composite (a) and pure $MAPbBr_3$ (b) as functions of UV light illumination time. (c) PL retention with the change of UV light illumination.

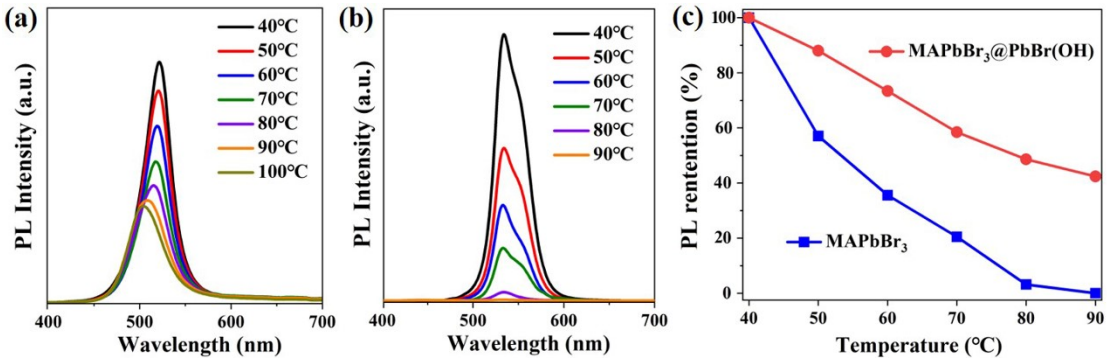

Fig. S14 PL spectra of $MAPbBr_3$@PbBr(OH) composite (a) and pure $MAPbBr_3$ (b) as functions of temperature. (c) PL retention with the change of heating temperature.

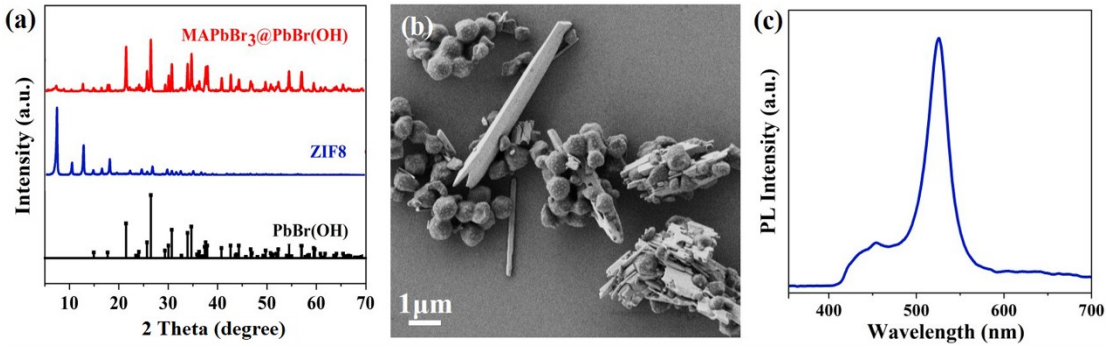

Fig. S15 XRD pattern (a), SEM image (b) and PL spectrum of $MAPbBr_3$@PbBr(OH) composite synthesized from ZIF-8.

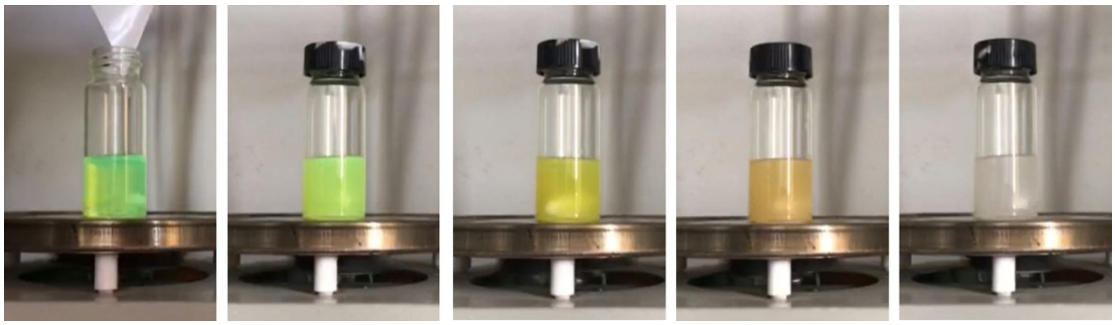

Fig. S16 Color variation of colloidal $MAPbBr_3$ solution containing MAF-6 with increased stirring time (0, 1, 3, 5 and 10 min, from left to right).

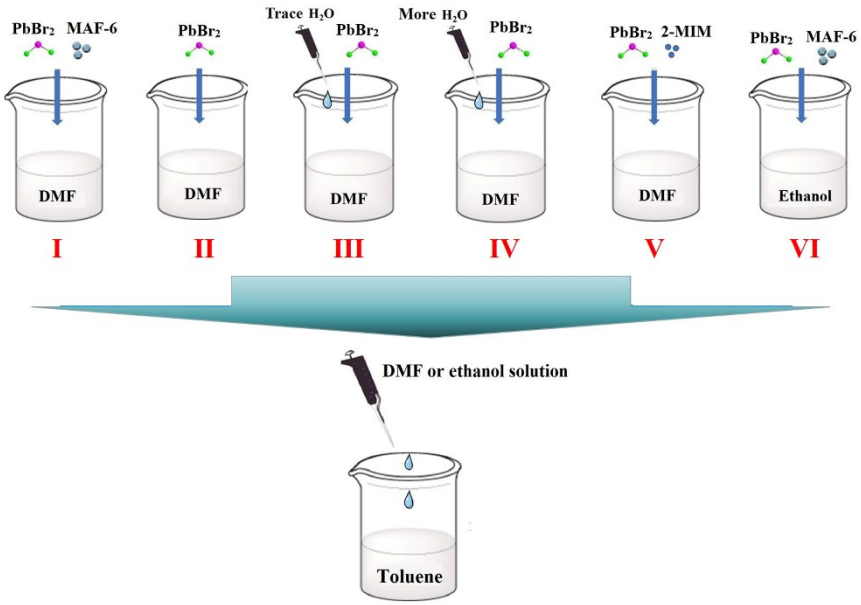

Fig. S17 Comparative experiments showing the important role of MOF played during the formation of PbBr(OH). (I DMF solution of $PbBr_2$ and MAF-6 in the absent of MABr and OABr, II DMF solution of sole $PbBr_2$, III DMF solution of $PbBr_2$ and trace water, IV DMF solution of $PbBr_2$ and more water, V DMF solution of $PbBr_2$ and 2-MIM, VI Ethanol solution of $PbBr_2$ and MAF-6. Consequently, 0.5 mL of the above DMF or ethanol solution was dropped into 10 mL toluene to get the final samples)

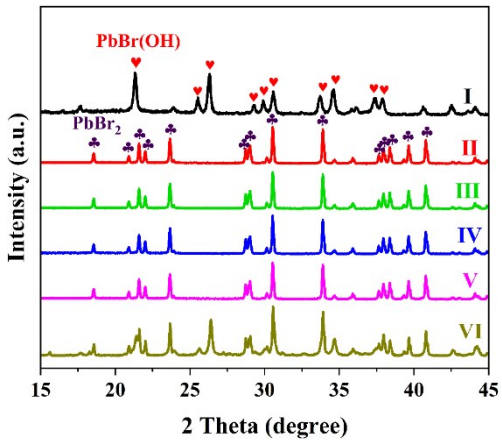

Fig. S18 XRD patterns of the samples obtained from the comparative experiments

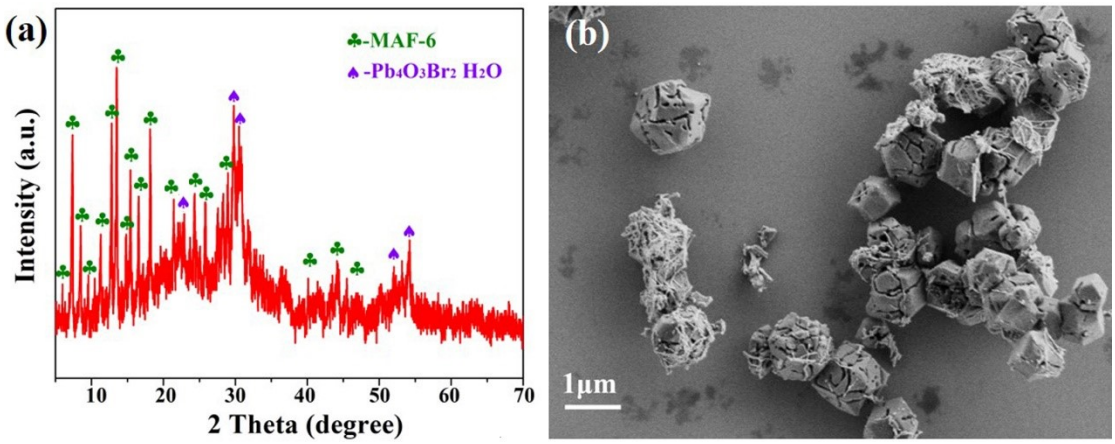

Fig. S19 XRD pattern (a) and SEM image (b) of the sample obtained by adding MAF-6 into DMF solution of $PbBr_2$.

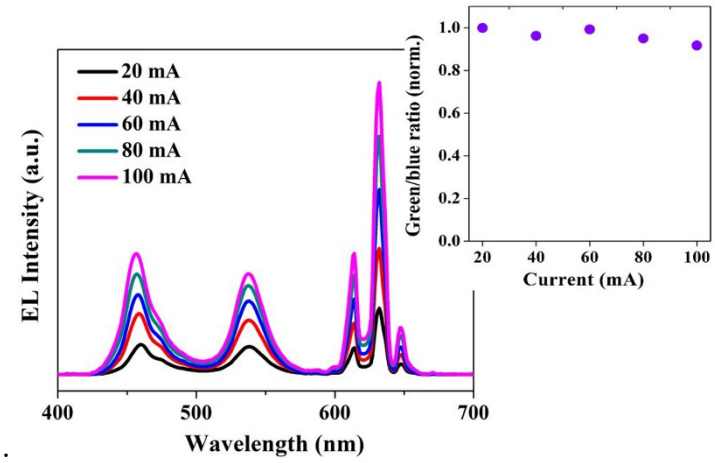

Fig. S20 EL spectra of the fabricated WLED as a function of applied forward current (Inset is the green-to-blue intensity ratio of WLED at increasing current).

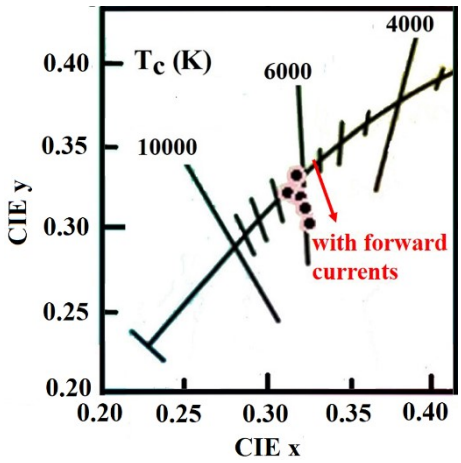

Fig. S21 CIE chromaticity coordinates of the fabricated WLED under different forward currents ((0.319, 0.332) for 20 mA, (0.313, 0.321) for 40 mA, (0.321, 0.319) for 60 mA, (0.325, 0.312) for 80 mA and (0.326, 0.303) for 100 mA).

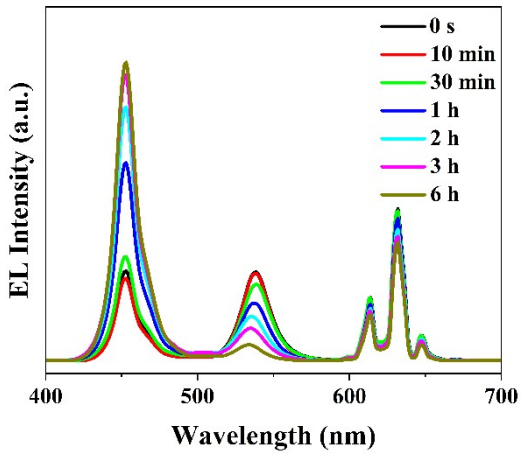

Fig. S22 EL spectra of the fabricated WLED as a function of working time at 20 mA