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

Supporting Information

Crystal Facet Engineering Induced Anisotropic Transport of Charge Carriers in a Perovskite

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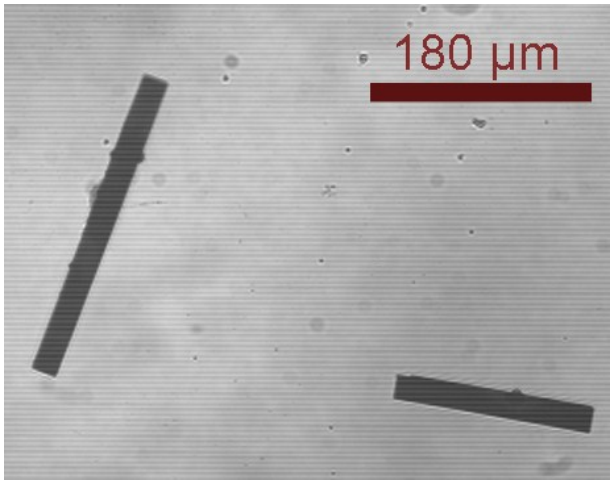

Fig. S1 The low-magnification optical images of the as-prepared $CH_3NH_3PbBr_3$ rods.

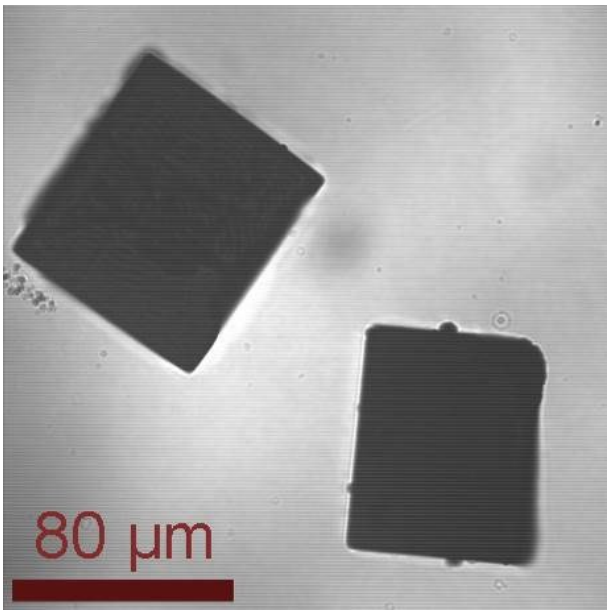

Fig. S2 The low-magnification optical images of the as-prepared $CH_3NH_3PbBr_3$ plates.

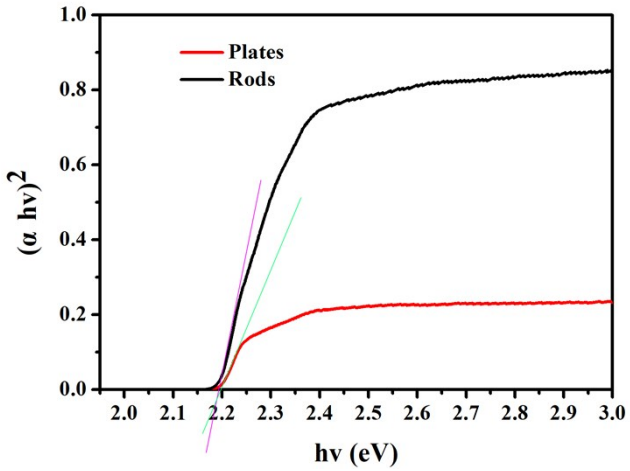

Fig. S3 Tauc plots of the absorption spectra of $CH_3NH_3PbBr_3$ single plates and single rods showing the material optical band gaps.

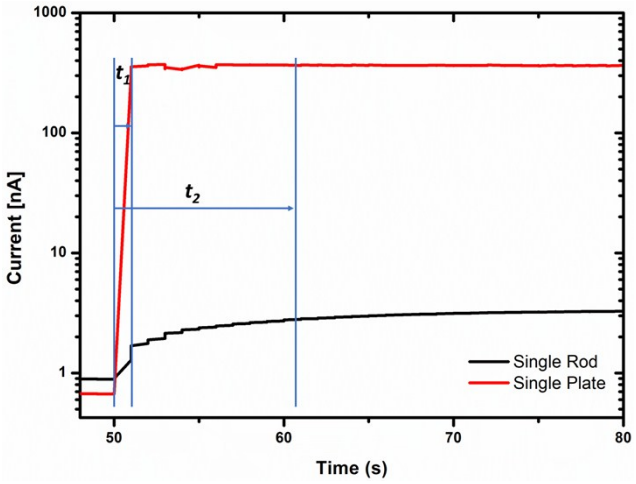

Fig. S4 Time-dependent photocurrent response of $CH_3NH_3PbBr_3$ single plate and single rod devices (rise time $t_1 << t_2$).

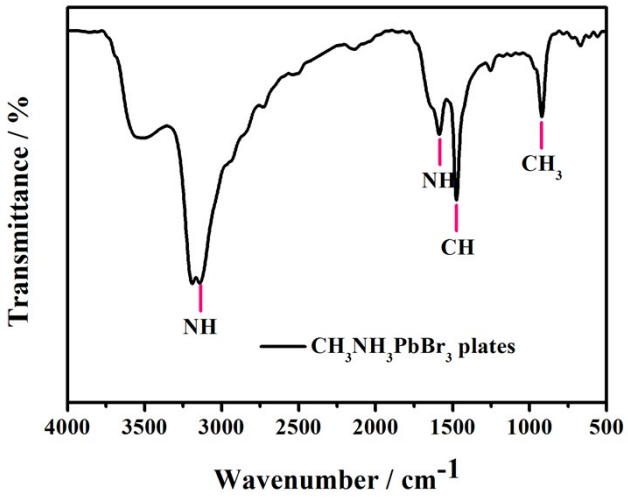

Fig. S5 The FTIR spectrum of the $CH_3NH_3PbBr_3$ plates. No ~722 cm^{-1} peak of the surfactants in the spectrum.[1,2]

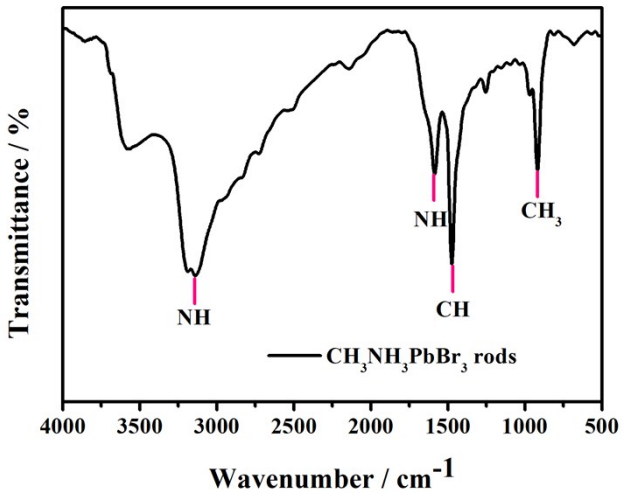

Fig. S6 The FTIR spectrum of the $CH_3NH_3PbBr_3$ rods. No ~722 cm^{-1} peak of the surfactants in the spectrum.[1,2]

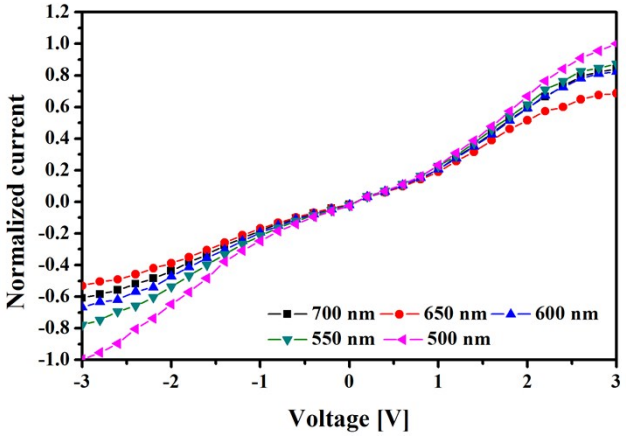

Fig. S7 I-V curves of a $CH_3NH_3PbBr_3$ single plate device illuminated with a light of different wavelengths (above 500 nm).

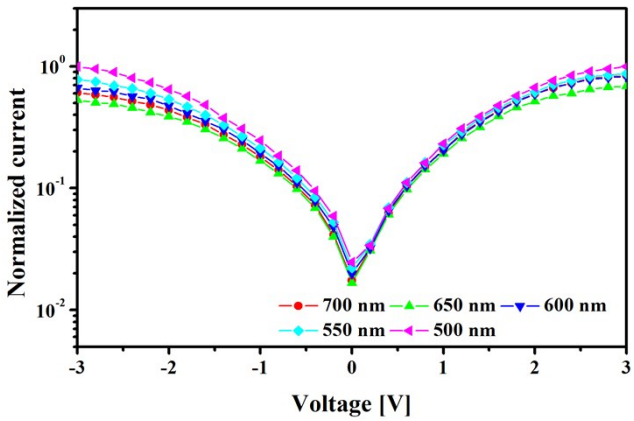

Fig. S8 Logarithmic current *vs* voltage of a $CH_3NH_3PbBr_3$ single plate device illuminated with a light of different wavelengths (above 500 nm).

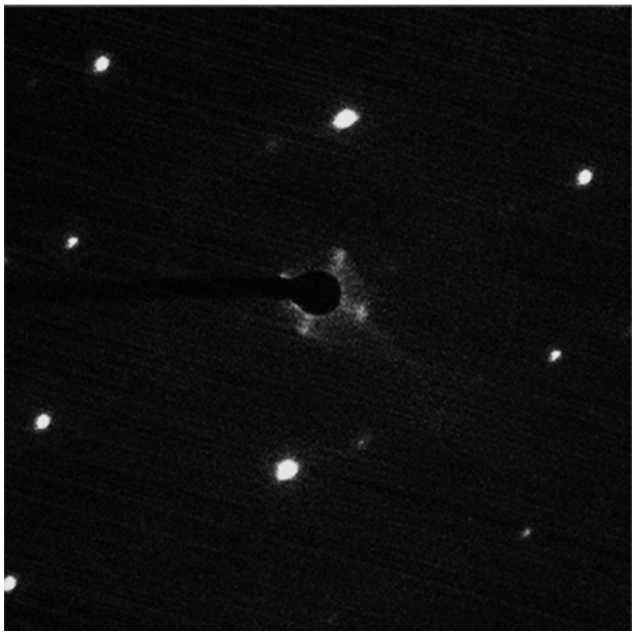

Fig. S9 *In situ* taken diffraction pattern of an individual $CH_3NH_3PbBr_3$ single rod under dark condition.

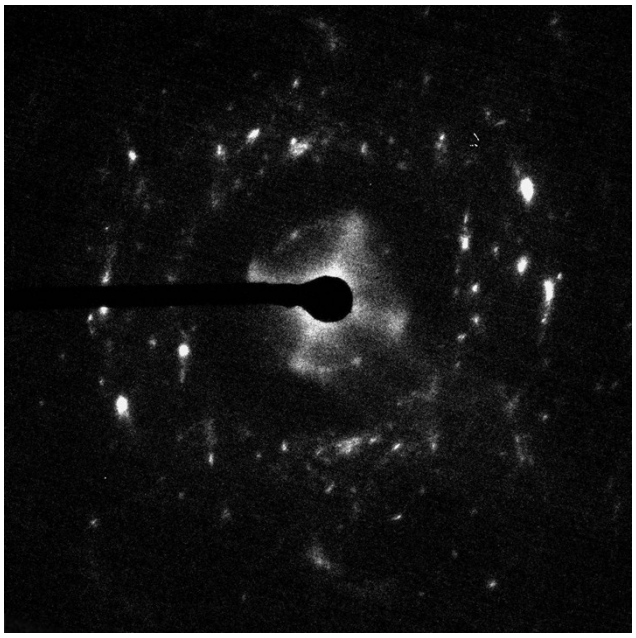

Fig. S10 *In situ* taken diffraction pattern of an individual $CH_3NH_3PbBr_3$ single rod under 405 nm light illumination.

Table S1. The PL lifetimes extracted from the original TRPL spectra of single plate and single rod samples.

	Single plate	Single rod
$\mathbf{A_1}$	3675.37	32497.0
$\boldsymbol{\tau_1}$ **(ns)**	0.628	0.55
$\mathbf{A_2}$	1256.91	9902.72
$\boldsymbol{\tau_2}$ **(ns)**	3.531	2.605
$\mathbf{A_3}$	294.89	1796.75
$\boldsymbol{\tau_3}$ **(ns)**	29.903	12.932
Backgr	65.33	60.75
$\boldsymbol{\chi^2}$	1.094	1.339
$\boldsymbol{\tau_{Av}}$ **(ns)**	18.04	5.64

Notes and References:

1 A. Kisner, S. Lenk, D. Mayer, Y. Mourzina, A. Offenhäusser, *J. Phys. Chem. C,* **2009**, *113*, 20143-20147.

2 J. Xu, S. Zhao, Y. Ji, Y. F. Song, *Chem.–Eur. J.,* **2013**, *19*, 709-715.