crystals

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Supporting Information

Charge Carrier Recombination Dynamics in MAPb($Br_{1-y}I_y$)$_3$ Single Crystals

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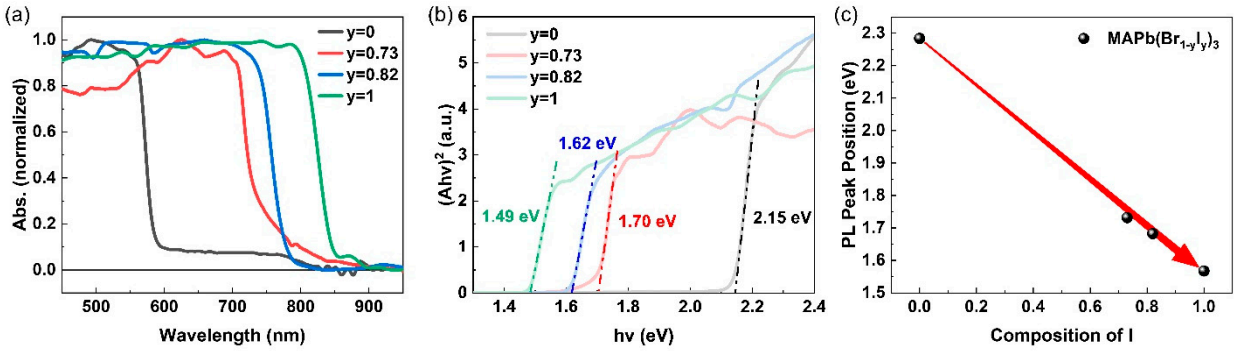

Figure S1. (a) Absorption spectra of MAPb($Br_{1-y}I_y$)$_3$ single crystals measured by integration sphere method. (b) Bandgap energy obtained by Tauc analysis. (c) The correlation between PL peak energies and I compositions for MAPb($Br_{1-y}I_y$)$_3$ single crystals.

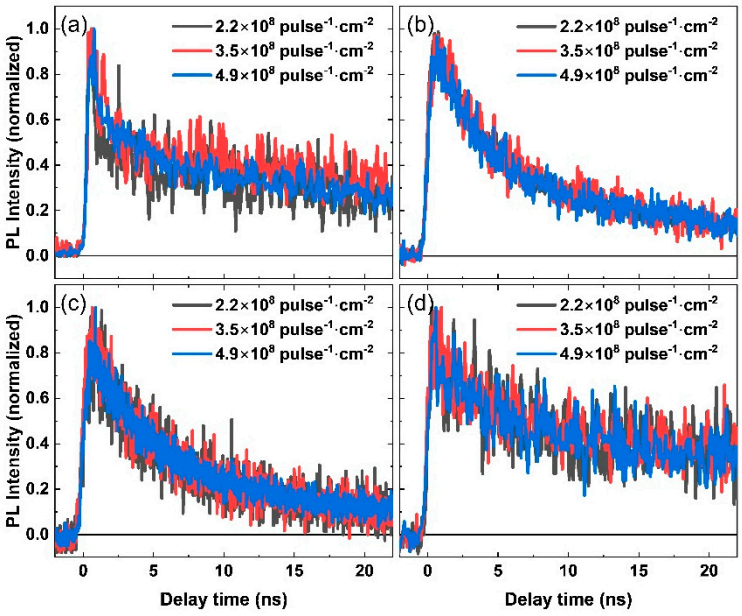

Figure S2. TRPL kinetics of $MAPb(Br_{1-y}I_y)_3$ single crystals with (a) y = 0; (b) y = 0.73; (c) y = 0.82; (d) y = 1 under different excitation fluencies.

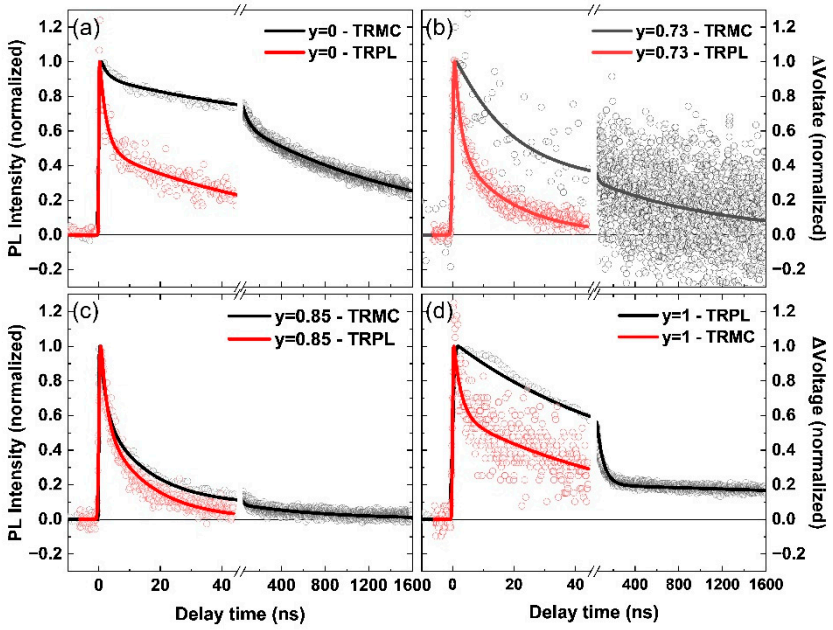

Figure S3. Comparison between TRMC and TRPL kinetics of $MAPb(Br_{1-y}I_y)_3$ single crystals with (a) y = 0; (b) y = 0.73; (c) y = 0.82; (d) y = 1 at room temperature. The solid lines are fitting curves based on multiple-exponential decay functions, and the detailed fitting parameters are shown in **Table 2**.

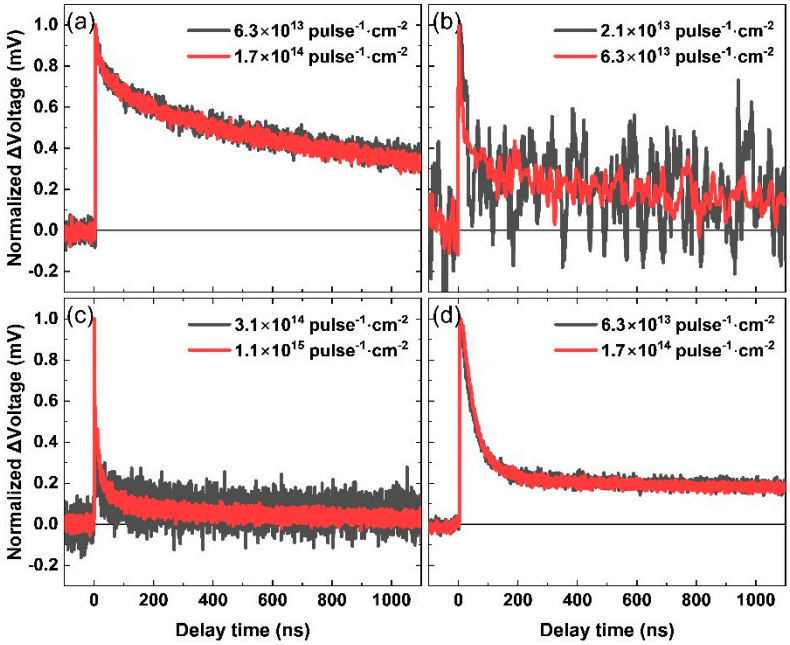

Figure S4. TRMC kinetics of $MAPb(Br_{1-y}I_y)_3$ single crystals with (a) y = 0; (b) y = 0.73; (c) y = 0.82; (d) y = 1 under different excitation fluencies.

Table S1. Lattice parameters of $MAPb(Br_{1-y}I_y)_3$ single crystals with different I compositions.

y	Crystal phase	Space group	*a* [Å]	*b* [Å]	*c* [Å]	*V* [Å^3]
0	cubic	*P* m-3m	5.94	5.94	5.94	209.58

0.73	cubic	*P* m-3m	6.22	6.22	6.22	240.64
0.82	cubic	*P* m-3m	6.25	6.25	6.25	244.14
1	tetragonal	*I* 4/mcm	8.93	8.93	12.76	1017.54