Supporting Information

Resolving in-plane and out-of-plane mobility using time resolved microwave conductivity

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Supplementary Figure S1 X-Ray diffraction (XRD) spectra of methylammonium lead iodide (MAPbI$_3$) and lead iodide (PbI$_2$). MAPbI$_3$ pattern indicates polycrystalline sample. PbI$_2$ 00l peaks are marked by #, indicating strong 00l texturing. Presence of 011 peak near 26° indicates minor polycrystallinity. * denotes substrate peaks. Dotted lines are reference patterns: PbI$_2$ – Inorganic Crystal Structure Database (ICSD) 77325, MAPbI$_3$ – Crystallography Open Database (COD) 4335638.1,2
S2. Time Resolved Microwave Conductivity of Lead Iodide Powder

Supplementary Figure S2 (a) 3D model and (b) schematic diagram of sample holder designed for time resolved microwave conductivity (TRMC) measurements on powder samples. (c) Photo-induced conductance ($\Delta G$) as a function of time for a powder of lead iodide (PbI$_2$). (d) TRMC figure of merit: $\phi \Sigma \mu = \phi (\mu_e + \mu_h)$, as a function of laser fluence for powder of PbI$_2$. Here $\phi$ is the fraction of electron-hole pairs generated per absorbed photon (between 0 and 1), $\mu_e$ is the average electron mobility and $\mu_h$ is the average hole mobility of carriers, over the illuminated sample area. The lines are fits to the experimental data of a model$^3$ that accounts for bimolecular and Auger recombination during the finite duration of the laser pulse. All measurements were carried out at room temperature in air.
Supplementary References

