Supporting Information

Relaxation Dynamics of Enhanced Hot-Electron Flow on Perovskite-Coupled Plasmonic Silver Schottky Nanodiodes

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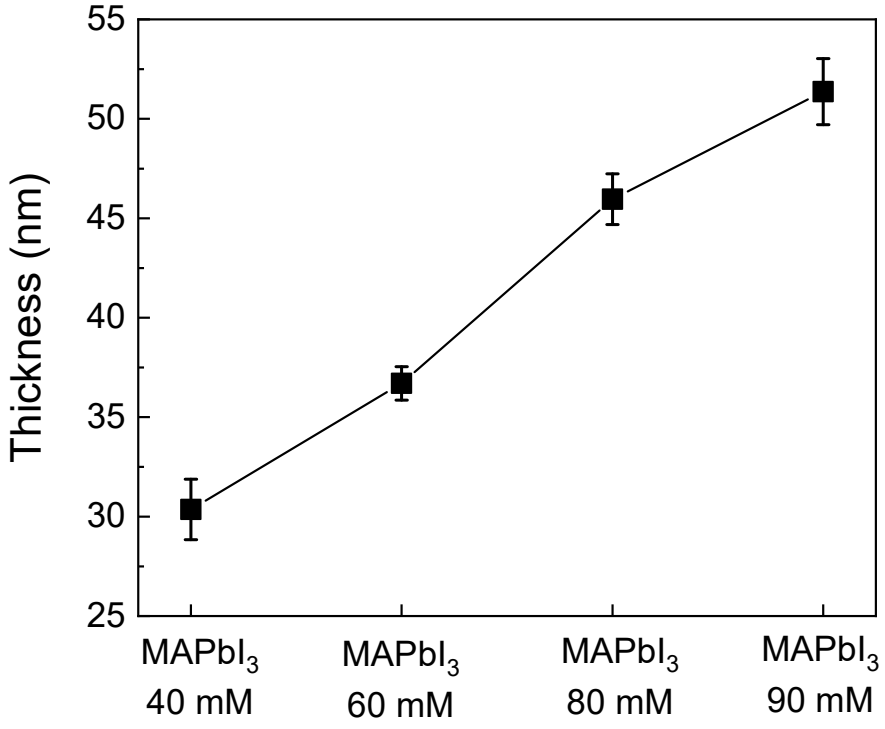

Figure S1. Thicknesses of $MAPbI_3$ thin-film according to the deposition of different concentrations of $MAPbI_3$ precursor ink.

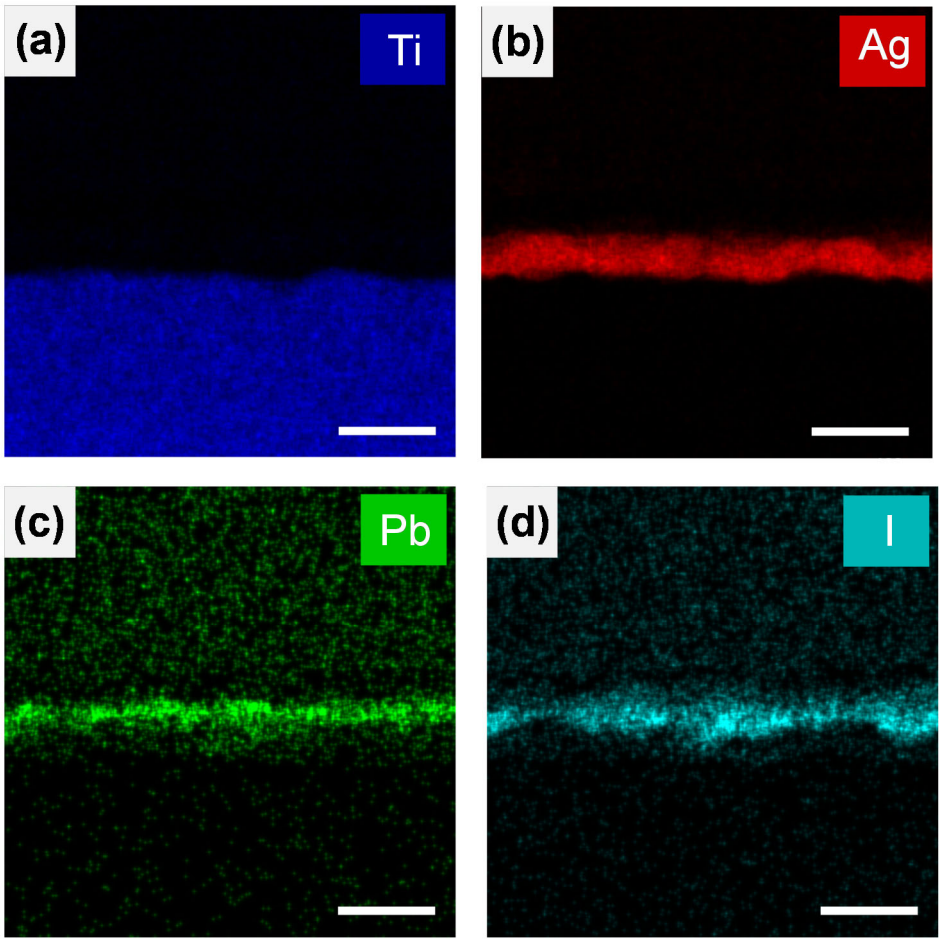

Figure S2. The STEM-EDS elemental mapping images represent (a) Ti, (b) Ag, (c) Pb, and (d) I. Scale bars are 100 nm.

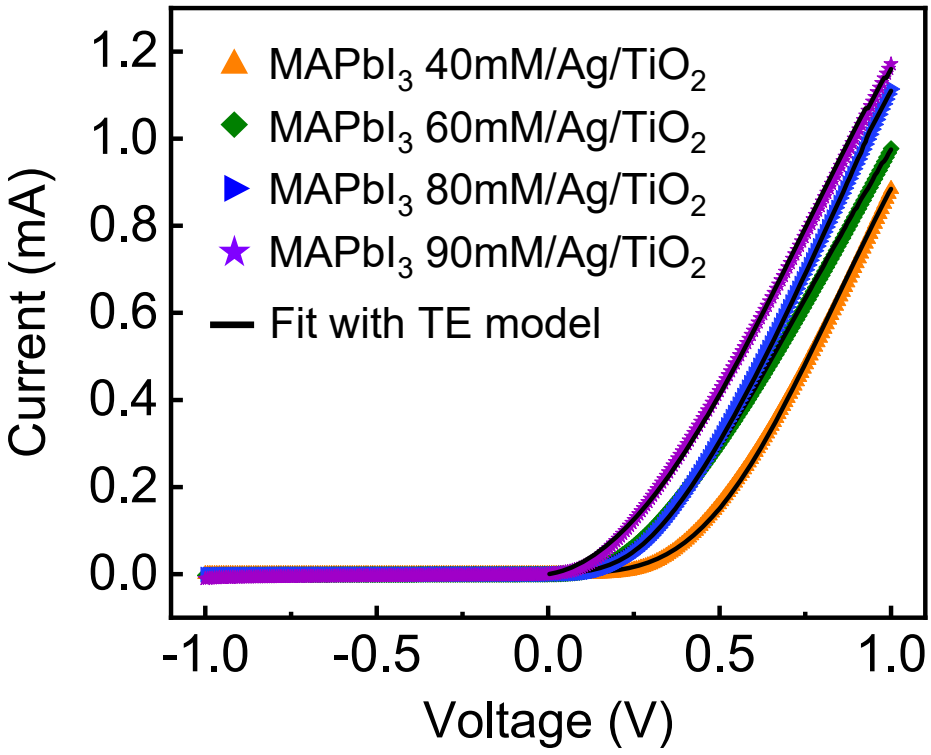

Figure S3. Current-voltage characteristics measured on the MAPbI3-modified Ag nanodiodes. The fits from the thermionic emission model are described with solid black lines.

The Schottky barrier heights can be acquired experimentally by fitting an obtained I-V curve with the thermionic emission equation,[1]

$$I = AA^{**}T^2 exp\left(-\frac{eE_{SB}}{k_b T}\right)\left[exp\left(\frac{q(V - IR_{ser})}{\eta k_b T} - 1\right)\right] \quad (1)$$

where A is the area of Schottky contact, A^{**} is the Richardson constant, e is the elementary charge, E_{SB} is the Schottky barrier height, k_b is the Boltzmann constant, T is the temperature, R_{ser} is the series resistance, and η is the ideality factor. The acquired parameters are listed in Table S1.

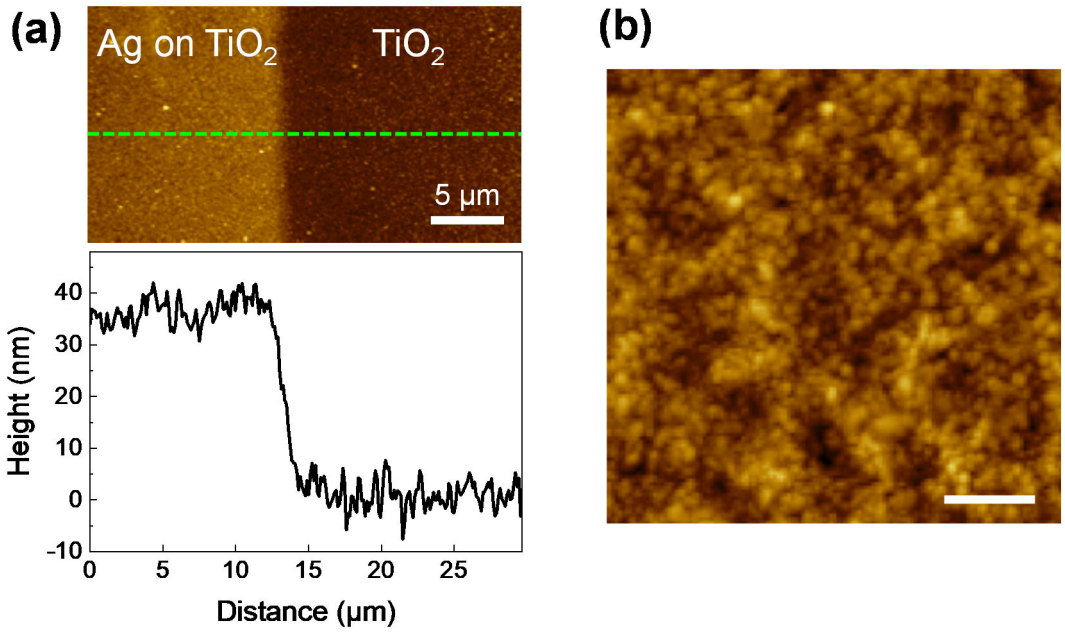

Figure S4. (a) AFM image of the pristine Ag/TiO_2 nanodiode (top) and the corresponding height profile along green dashed line (bottom). The 40 nm thick Ag film on the TiO_2 layer has an RMS roughness of 5.2 nm. (b) AFM topography image of the pristine 40 nm thick Ag film on the TiO_2 layer. Scale bar is 500 nm.

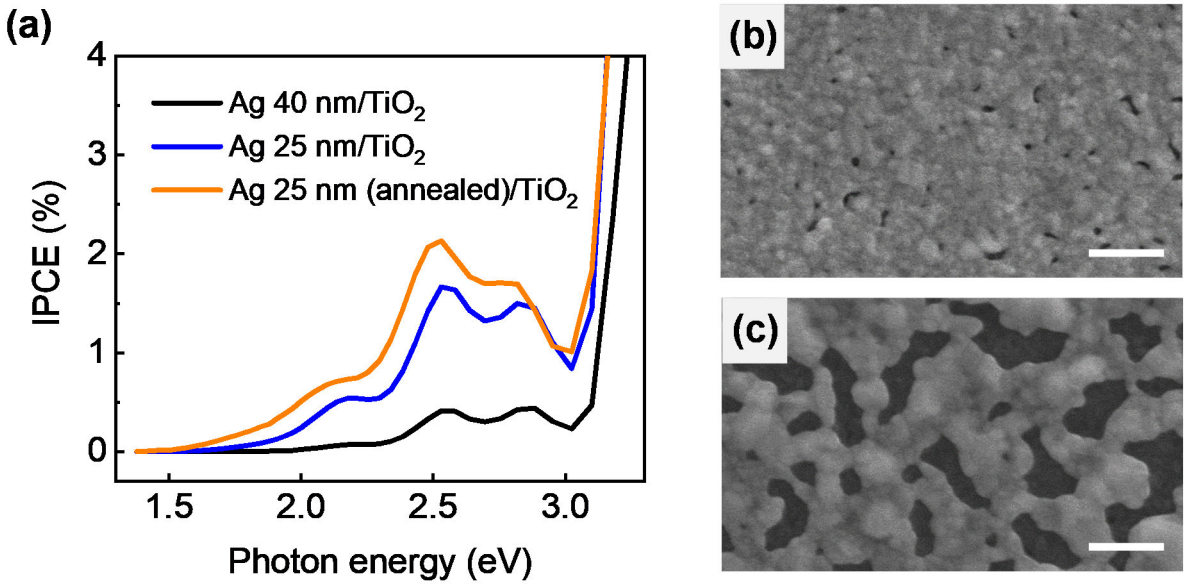

Figure S5. (a) IPCE results as a function of photon energy measured on a different Ag morphology. The surface SEM images of (b) a 25 nm Ag film and (c) an annealed 25 nm Ag film are represented. Scale bars are 250 nm.

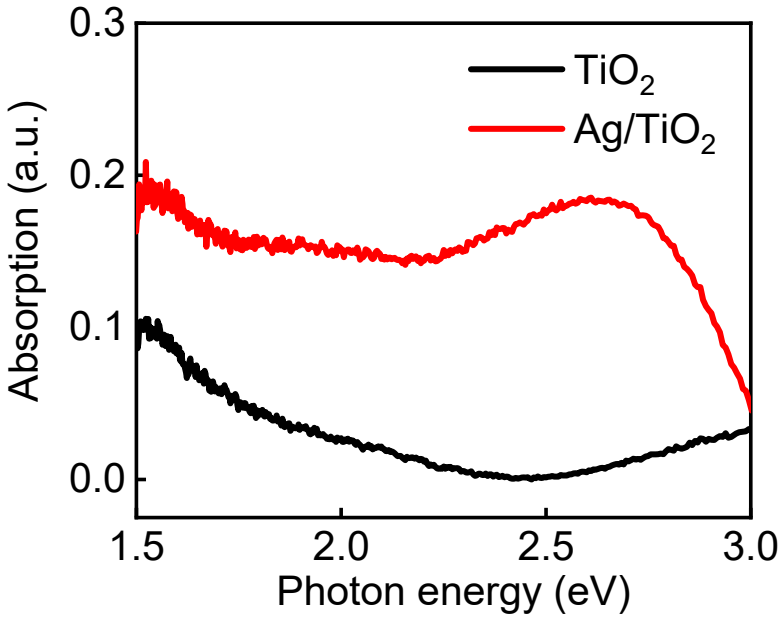

Figure S6. (a) Absorption spectrum measured on a bare TiO_2 and Ag/TiO_2 structure.

	E_{SB} (eV)	R_{ser} (Ω)	η
$MAPbI_3$ 40 mM/Ag/TiO_2	0.64	495	3.1
$MAPbI_3$ 60 mM/Ag/TiO_2	0.6	607	2.86
$MAPbI_3$ 80 mM/Ag/TiO_2	0.63	525	2.42
$MAPbI_3$ 90 mM/Ag/TiO_2	0.58	574	2.65

Table S1. Summary of parameters obtained by fitting measured current-voltage curves to the thermionic emission equation.

Reference

1. Sze, S. M.; Ng, K. K., *Physics of Semiconductor Devices*, 3rd ed.; Wiley-Interscience: Hoboken, N.J., 2007.