

Supplementary Materials

Table S1. Simulation Parameters of MASnI₃-based solar cell.

Parameters	Spiro	MASnI ₃	TiO ₂	FTO
Thickness (<i>um</i>)	0.20	Variable	0.05	0.5
Bandgap (eV)	3.17	Variable	3.2	3.5
Electron affinity (eV)	2.05	3.49	3.9	4.0
Dielectric Permittivity	3.00	20.0	9.0	9.0
CB Effective Density of States (1/cm ³)	2.2 × 10 ¹⁸	1.0E+19	2.0E+17	2.2E+18
VB Effective Density of States (1/cm ³)	1.8 × 10 ¹⁹	1.0E+19	6.0E+17	1.8E+19
Electron Thermal Velocity (cm/s)	1.0E+7	1.0E+7	1.0E+7	1.0E+7
Hole Thermal Velocity (cm/s)	1.0E+7	1.0E+7	1.0E+7	1.0E+7
Electron Mobility (cm ² /Vs)	2.0E-4	2.30E+3	1.00E+2	2.00E+1
Hole Mobility (cm ² /Vs)	2.0E-4	3.20E+2	2.50E+1	1.00E+1
Donor Density ND (1/cm ³)	0.0E+0	1.0E+9	1.0E+17	1.0E+17
Acceptor Density NA (1/cm ³)	2.0E+19	1.0E+9	0.0E+0	0.0E+0