

Supplementary Material

Monolithic perovskite-carrier selective contact silicon tandem solar cells using molybdenum oxide as a hole selective layer

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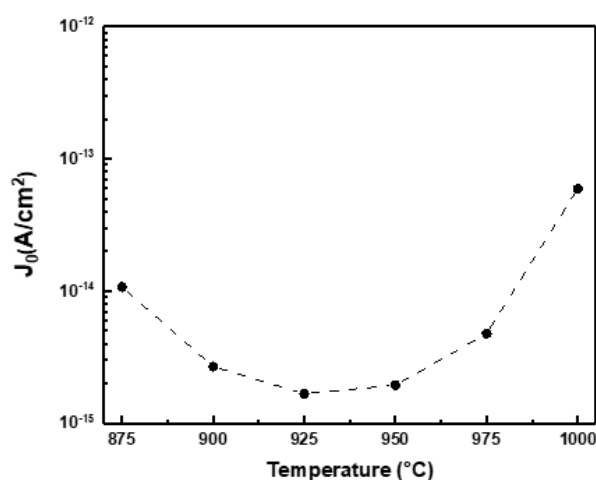


Figure S1. Recombination current density of n^+ poly Si/tunnel oxide/Si symmetric structures according to annealing temperature

Year	Institute	V_{oc} [mV]	J_{sc} [mA/cm ²]	FF [%]	Eff. [%]	Hole selective contact structure	Remark
2014	Berkeley ²⁵	580	37.8	65	14.3	MoO _x / c-Si(n)	No interlayer, textured surface
2014	Berkeley ²⁷	711	39.4	67.2	18.8	MoO _x / a-Si:H (i) / c-Si(n)	Textured surface
2015	ANU ²⁶	637	35	75	16.7	MoO _x / SiO _x / c-Si(n)	Planar surface
2015	ANU ⁴³	658	39.8	77.8	20.4	c-Si(p) / MoO _x	Textured surface, no interlayer, partial rear contacts
2015	EPFL ²⁸	725	38.6	80.4	22.5	MoO _x / a-Si:H (i) / c-Si(n)	Textured surface
2016	Berkeley ²⁹	706	38.4	76.2	20.7	MoO _x / a-Si:H (i) / c-Si(n)	Textured surface
2019	UCAS ⁴⁴	631	36	80.8	18.4	c-Si(p) / MoO _x	Textured surface, no interlayer, back surface field
2020	UCAS ⁴⁵	635	38.1	79.1	19.1	c-Si(p) / UV-SiO _x / MoO _x	Textured surface, back surface field
2020	EPFL ⁴⁶	733	38.9	81.7	23.5	MoO _x / a-Si:H (i) / c-Si(n)	Textured surface

Table S1. Efficiency table of MoO_x hole selective contact silicon solar cells

Type of solar cell	V_{oc} [V]	J_{sc} [mA/cm ²]	FF [%]	PCE [%]
#1-1 MoO _x -ITO 80 nm	1.485	9.77	55.05	8.0
#1-2 MoO _x -ITO 20 nm	1.501	9.54	54.15	7.8
#2 MoO _x -SnO ₂	0.996	9.60	34.04	3.3

Table S2. Photovoltaic parameters of the monolithic perovskite-carrier selective contact silicon tandem solar cells

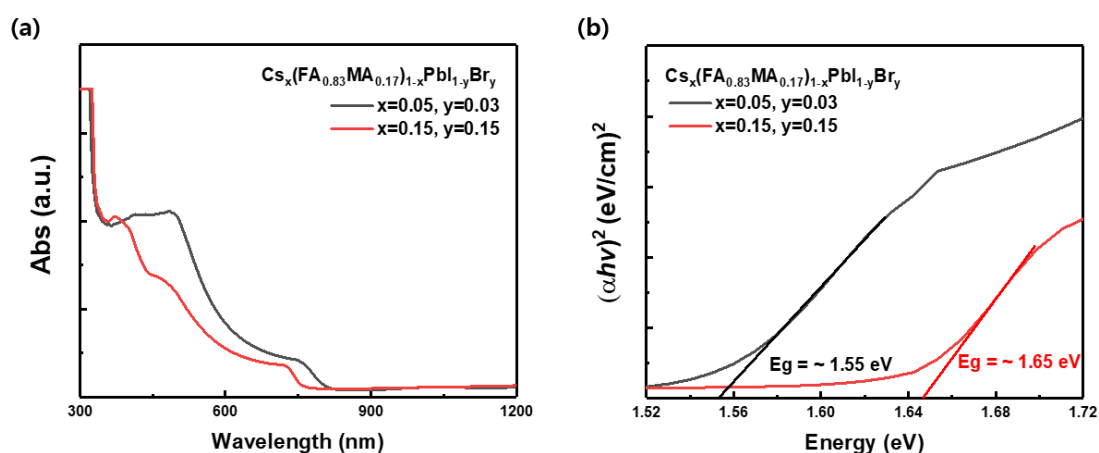


Figure S2. (a) UV-vis absorption spectra and (b) Tauc plot of the perovskite layer according to the composition

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