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Supporting Information

Performance Optimization in Gate-tunable Schottky Junction Solar Cells with Light Transparent and Electric-field Permeable Graphene Mesh on n-Si

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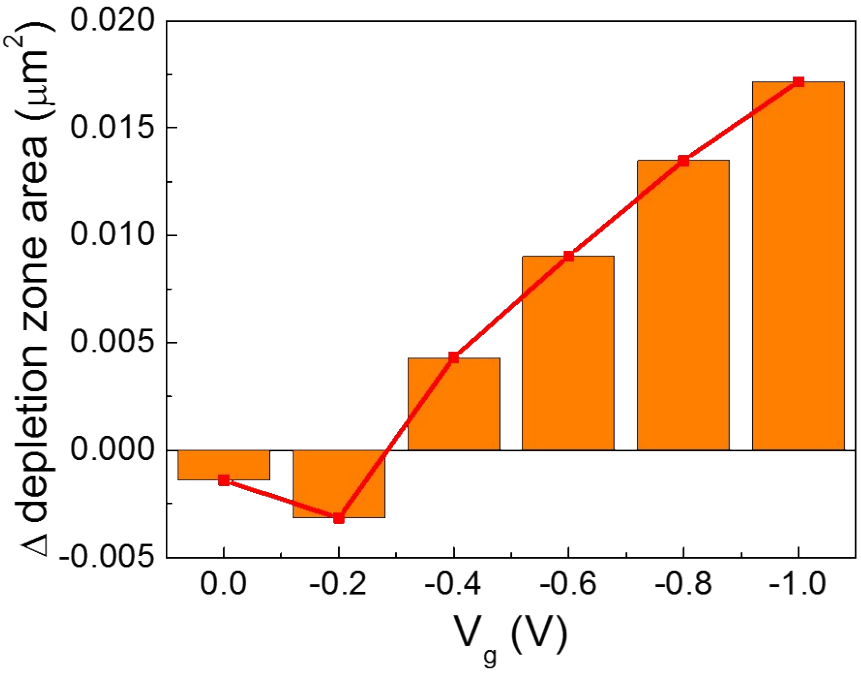


Figure S1. The difference of depletion zone areas between Gr-Si and GM-Si Schottky junctions (i.e., depletion area of GM-Si Schottky junction – depletion area of GM-Si Schottky junction) in Figure 4. The depletion zone was defined as the region whose electrical potential is smaller than 4.26 eV (dotted lines in Figure 4).

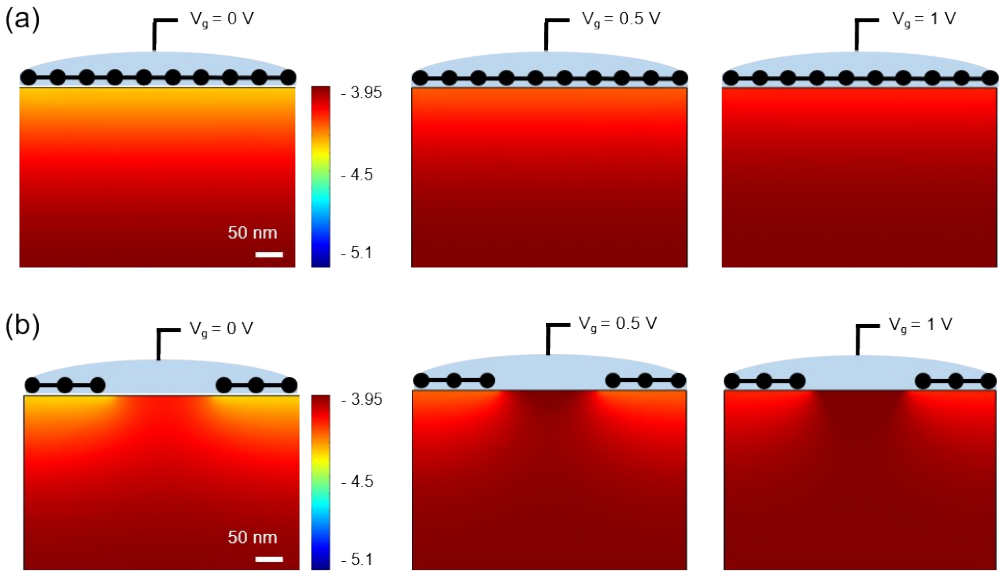
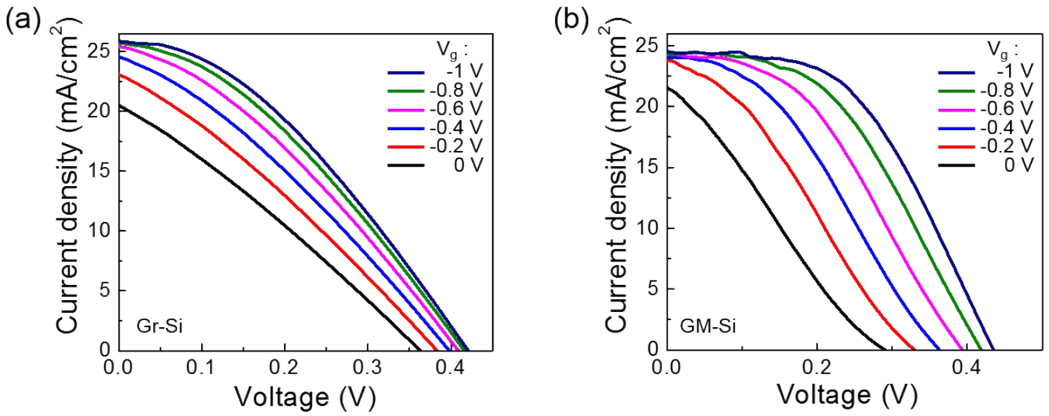


Figure S2. FEA simulation results for Gr-Si (a) and GM-Si (b) SJSCs with positive V_g.



Gr-Si SJSC

V_g [V]	V_{oc} [V]	J_{sc} [mA/cm^2]	FF	*PCE* [%]
0	0.36	20.51	0.28	2.10
-0.2	0.38	23.08	0.30	2.59
-0.4	0.39	24.57	0.32	3.02
-0.6	0.4	25.42	0.34	3.42
-0.8	0.41	25.70	0.35	3.73
-1	0.42	25.86	0.36	3.94

GM-Si SJSC

V_g [V]	V_{oc} [V]	J_{sc} [mA/cm^2]	FF	*PCE* [%]
0	0.29	21.53	0.25	1.57
-0.2	0.32	23.84	0.32	2.43
-0.4	0.36	24.01	0.37	3.19
-0.6	0.39	24.43	0.41	3.94
-0.8	0.41	24.25	0.47	4.66
-1	0.43	24.52	0.50	5.25

Figure S3. J-V plots of (a) Gr-Si and (b) GM-Si SJSCs that have initially poor performance (presumably due to poor interface between graphene and Si), under AM1.5G illumination and the indicated V_g applied to the gate electrode. Bottom: The corresponding photovoltaic parameters.