

Performance Enhancement of Thin-Film Amorphous Silicon Solar Cells with Low Cost Nanodent Plasmonic Substrates

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Supplementary Information

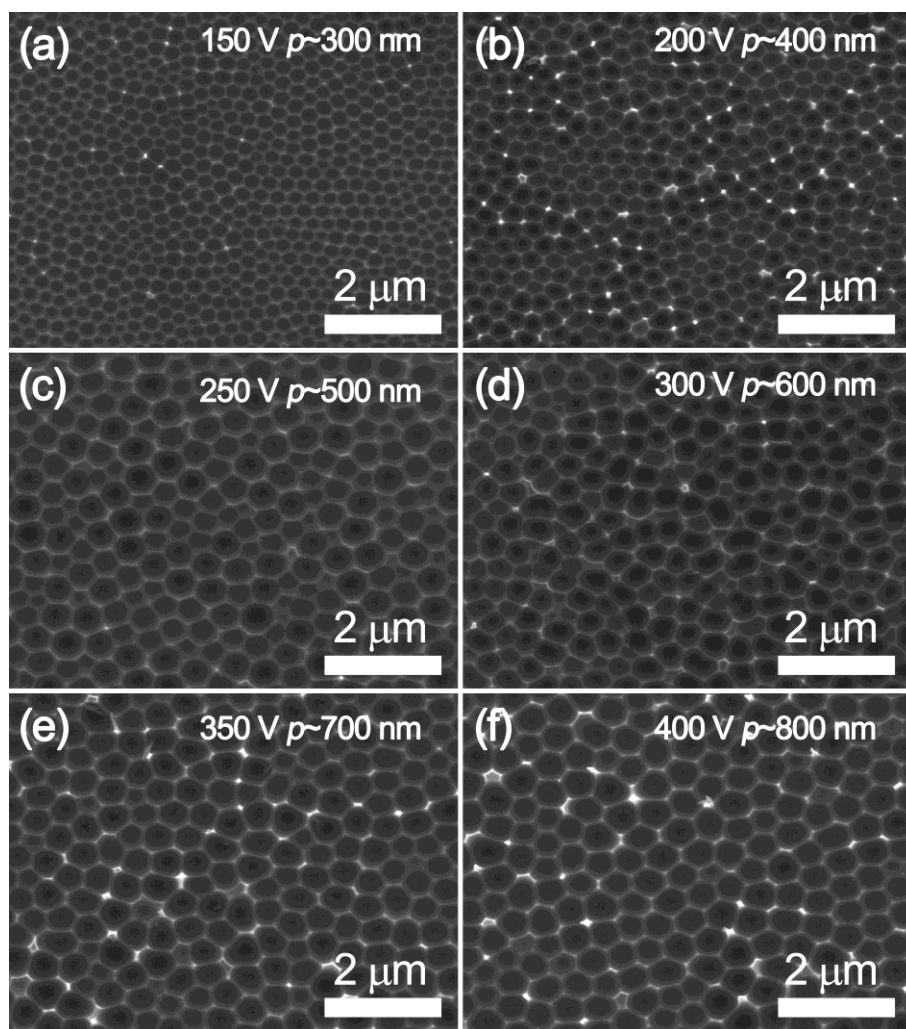


Fig. S1 SEM images of patterned Al substrates anodized under (a) 150V, (b) 200 V, (c) 250 V, (d) 300 V, (e) 350 V and (f) 400 V.

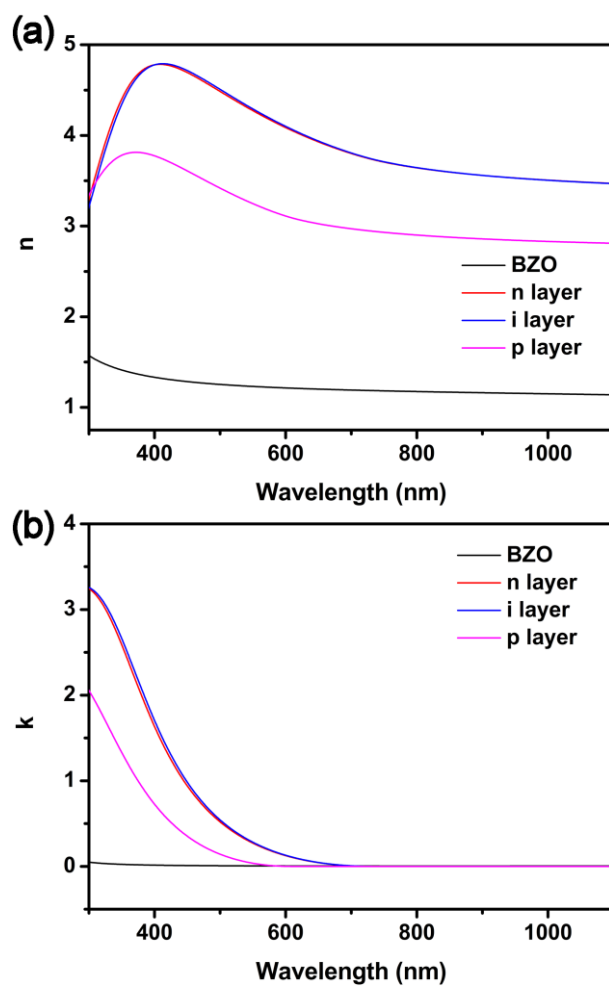


Fig. S2 Measured refractive index (a) and extinction coefficient (b) of BZO and *n-i-p* a-Si:H

layers.

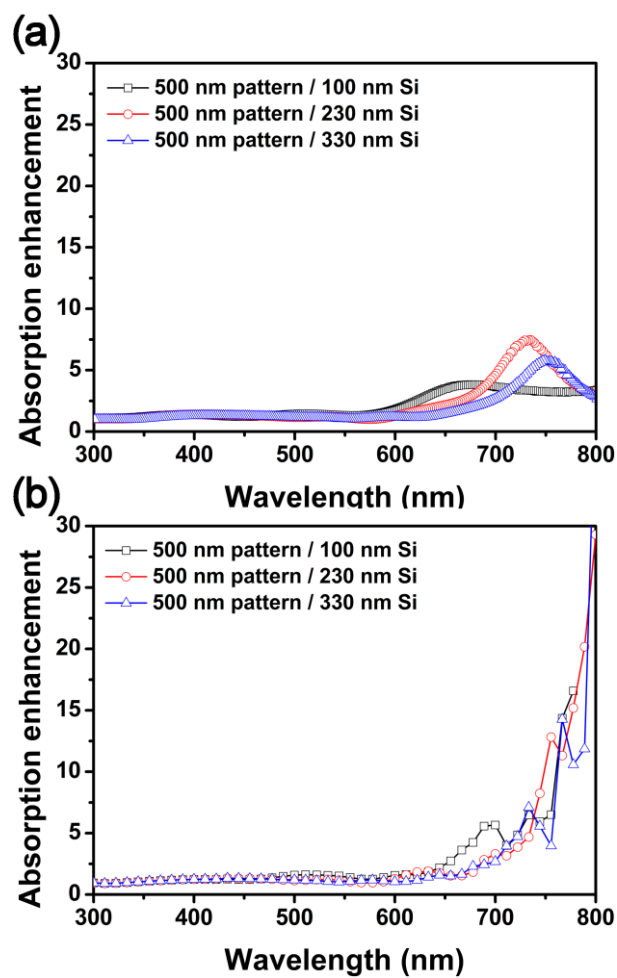


Fig. S3 (a) Absorption enhancement of the whole devices calculated from the measured reflectance. (b) Absorption enhancement of the silicon layer calculated by simulation.

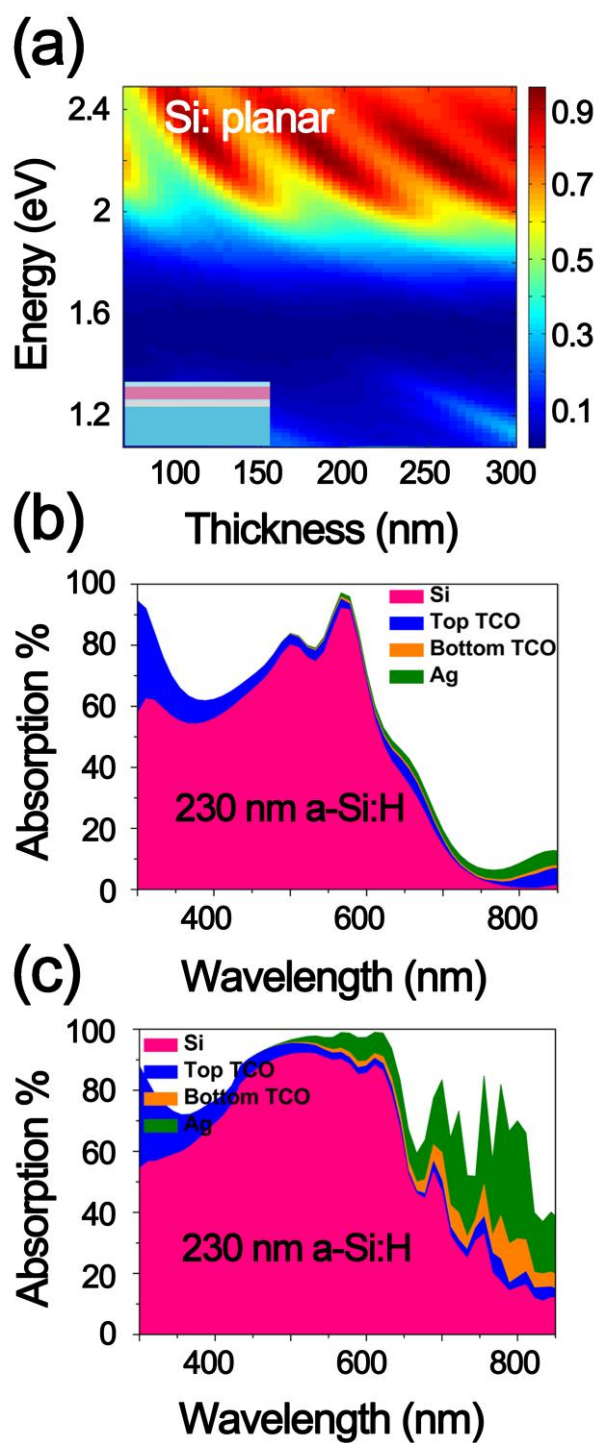


Fig. S4 (a) Contour plot of calculated absorption of a-Si:H on polished substrate. (b, c) Calculated absorption of each layer in planar (b) and patterned (c) devices with 230 nm silicon layers.

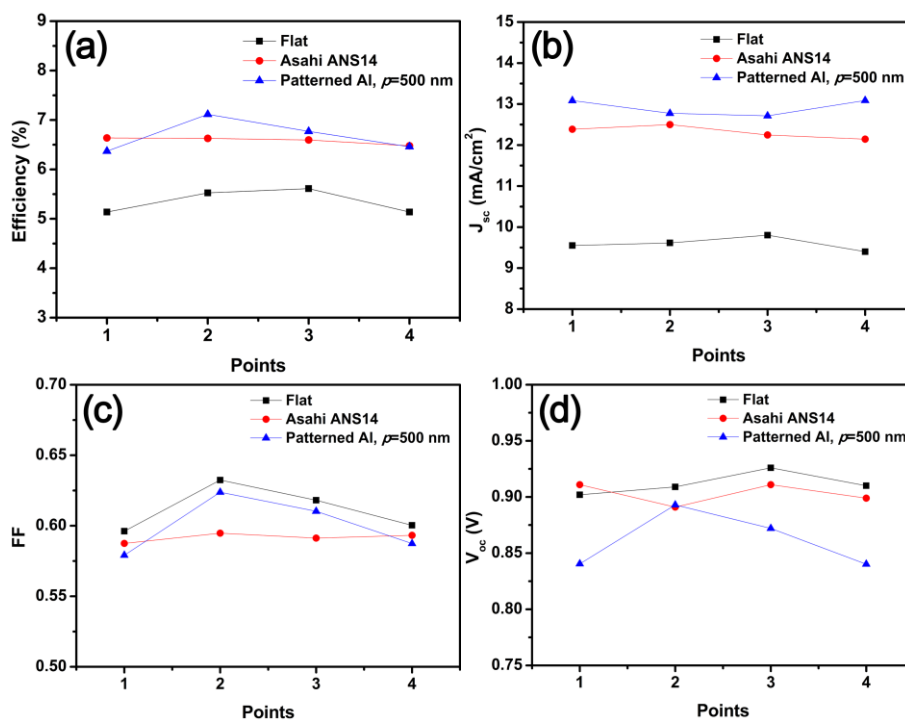


Fig. S5 Statistics of the performance parameters of solar cells on planar substrate, Asahi ANS14

glass and patterned Al: (a) efficiencies; (b) short circuit current densities; (c) fill factors; (d) open circuit voltages

Table S1 Statistics of electrical performance

	Flat			Asahi ANS14			Patterned Al		
	Maximum	Minimum	Mean	Maximum	Minimum	Mean	Maximum	Minimum	Mean
η %	5.6112	5.1362	5.3520	6.6355	6.4783	6.5842	7.1149	6.3745	6.6756
J_{sc} mA/cm ²	9.8016	9.4001	9.5914	12.4991	12.1442	12.3190	13.1162	12.7127	12.9278
FF	0.5961	0.6324	0.6117	0.5947	0.5875	0.5916	0.6238	0.5809	0.6006
V_{oc} V	0.9261	0.9020	0.9117	0.9118	0.8916	0.9033	0.8928	0.8406	0.8617