Supporting Information

The effect of ZnO preparation on the performance of inverted polymer solar cells under one sun and indoor light

Yun-Ming Sung[a], Abdul Khalik Akbar[a], Sajal Biring[a], Chia-Feng Li[b], Yu-Ching Huang[b]*, Shun-Wei Liu[a]*

[a]Organic Electronics Research Center and Department of Electronic Engineering, Ming Chi University of Technology, New Taipei City 24301, Taiwan

[b]Department of Materials Engineering, Ming Chi University of Technology, New Taipei City 24301, Taiwan

*Corresponding authors:

E-mail:

huangyc@mail.mcut.edu.tw (Y.-C. Huang)

swliu@mail.mcut.edu.tw (S.-W. Liu)

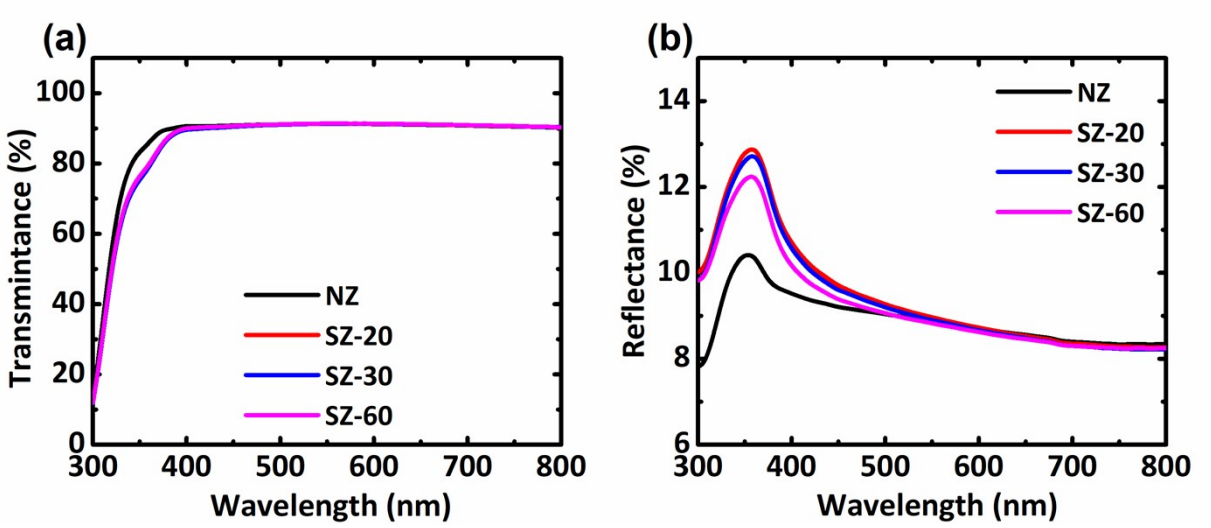

Fig. S1 (a) transmittance and (b) reflectivity spectrum of various ZnO films.

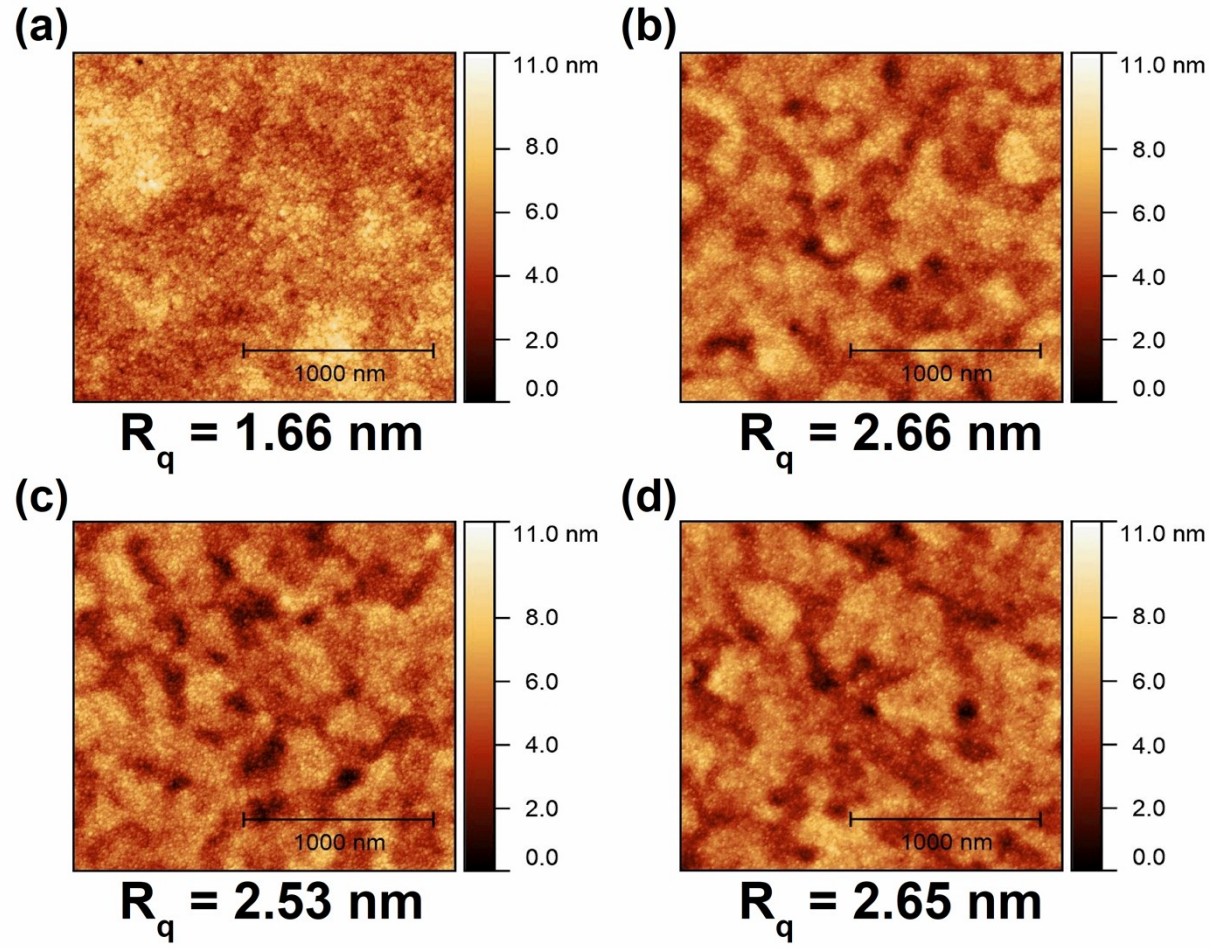

Fig. S2 AFM images of the (a) NZ, (b) SZ-20, (c) SZ-30 and (d) SZ-60 films.

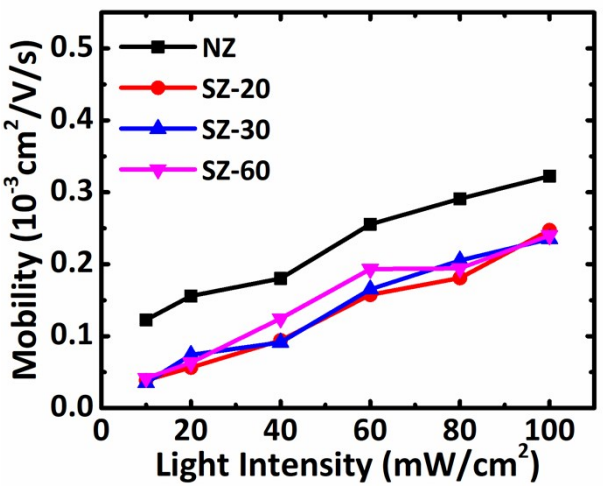

Fig. S3 Device's mobility extracted from the impedance measurement under simulated sunlight with various light intensities.

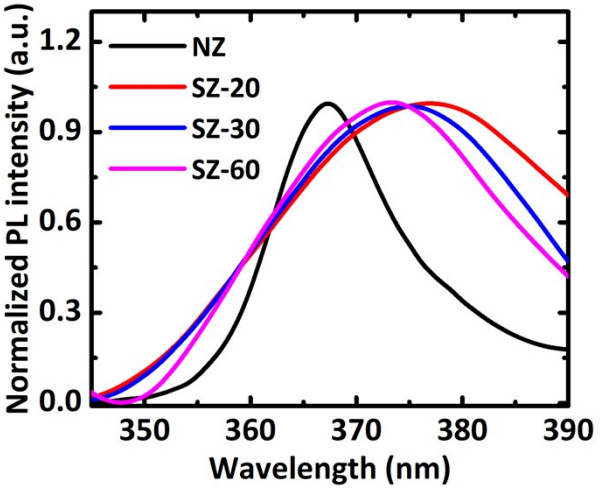

Fig. S4 Photoluminescence spectrum of ZnO thin film excited by a 305 nm LED laser.

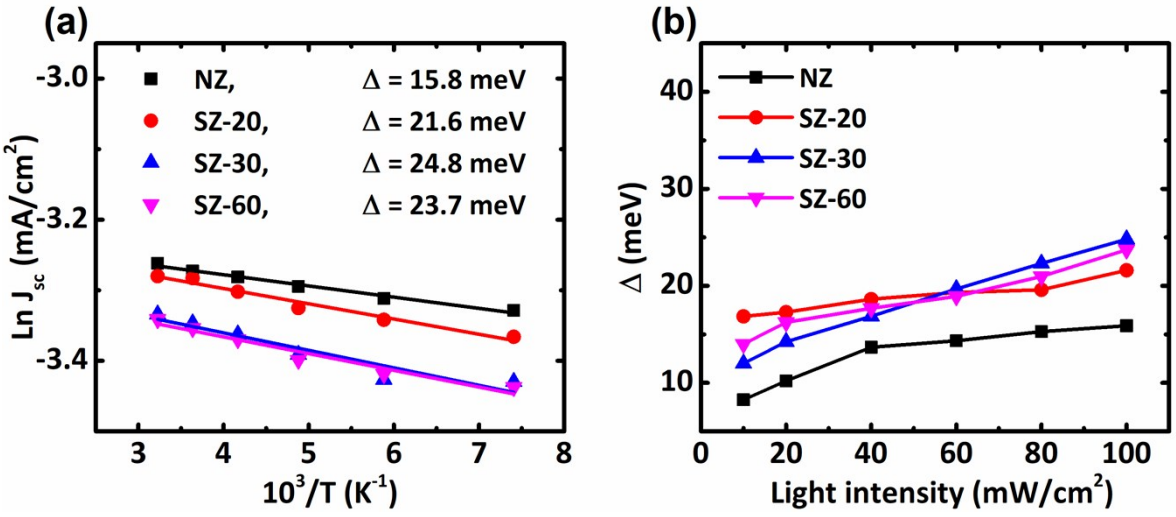

Fig. S5 (a) the results of PSC's temperature dependent J_{sc} in one sun condition and (b) calculated trap depth under simulated sunlight with various light intensities.

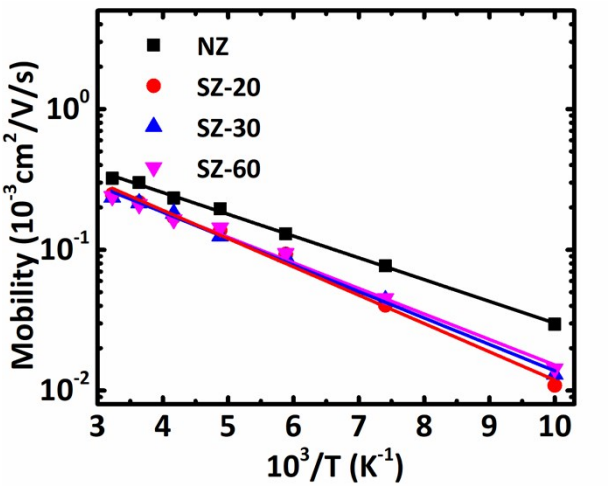

Fig. S6 PSC's temperature dependent mobility.

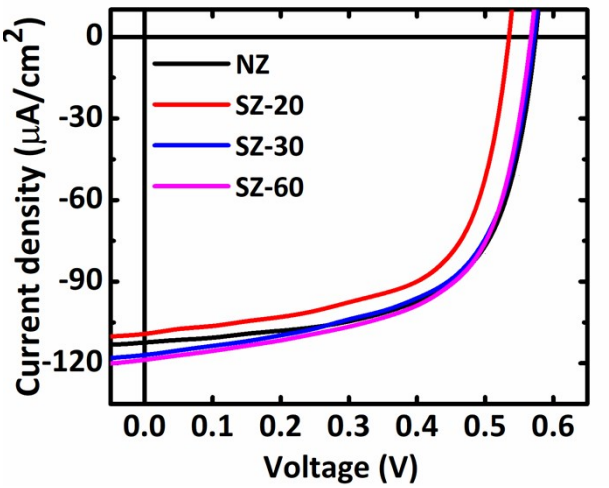

Fig. S7 Current density-voltage results of NZ-based and SZ-based PSCs under 0.290 mW/cm² (1000 Lux) indoor light.

Table S1 Summary of device's electrical characteristics with different ZnO preparation under various light intensities.

ETL	**Light intensity (mW/cm²)**	J_{sc} **(μA/cm²)**	V_{oc} **(V)**	**FF (%)**	**η (%)**
NZ	0.058	22.81	0.52	56.44	11.08
	0.116	45.27	0.54	58.94	12.3
	0.174	66.53	0.56	63	13.53
	0.223	92.43	0.57	63.12	14.32
	0.290	112.11	0.58	64.57	14.38
SZ-20	0.058	24.17	0.46	59.98	11.53
	0.116	46.61	0.49	58.48	11.62
	0.174	69.95	0.51	63.67	13.1
	0.223	91.44	0.52	63.58	13.14
	0.290	111.66	0.54	64.83	13.53
SZ-30	0.058	25.35	0.5	52.8	11.48
	0.116	48.02	0.53	56.78	12.52
	0.174	70.67	0.55	61.53	13.86
	0.223	93.19	0.56	62.29	14.12
	0.290	116.89	0.57	61.71	14.28
SZ-60	0.058	25.35	0.5	53.7	11.74
	0.116	48.54	0.53	59.3	13.04
	0.174	72.49	0.55	60.79	13.96
	0.223	95.6	0.56	62.98	14.54
	0.290	118.59	0.57	63.11	14.7