Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics.

Electronic Supplementary Information

Inverted Organic Solar Cells Enhanced by Grating-coupled Surface Plasmons and Waveguide Modes

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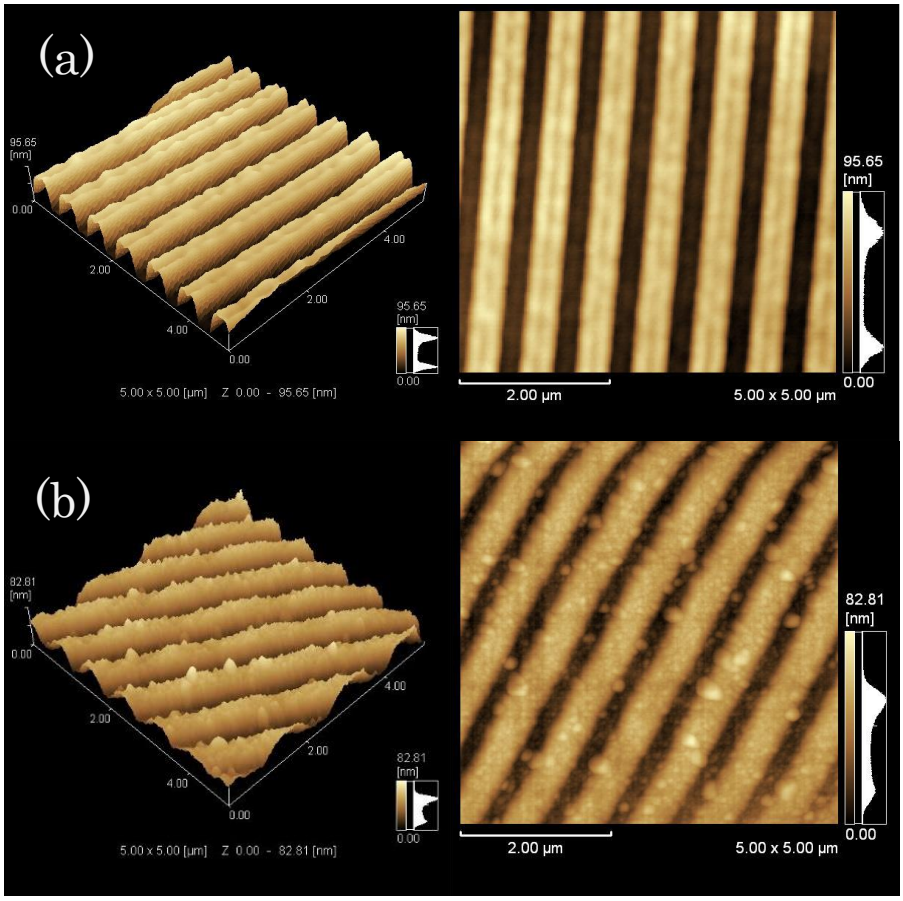

Figure S1. AFM images of (a) P3HT:PCBM and (b) Au electrode surfaces

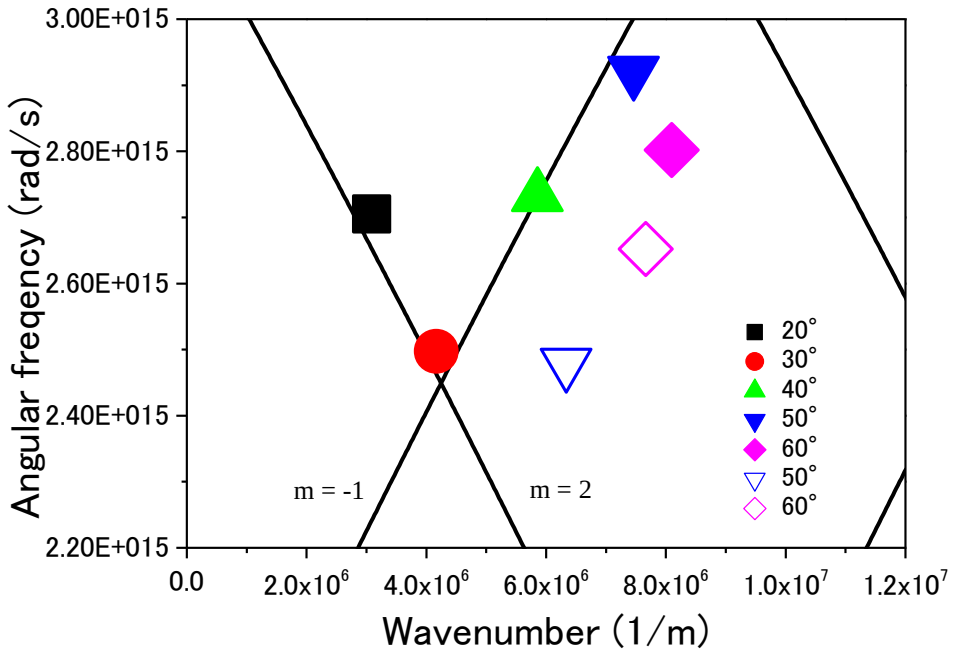

Figure S2. Experimental reflectivity dip angles with p-pol light (symbols) and calculated SP dispersion branches (solid lines) on the Au grating (a) and on the Ag grating (b).

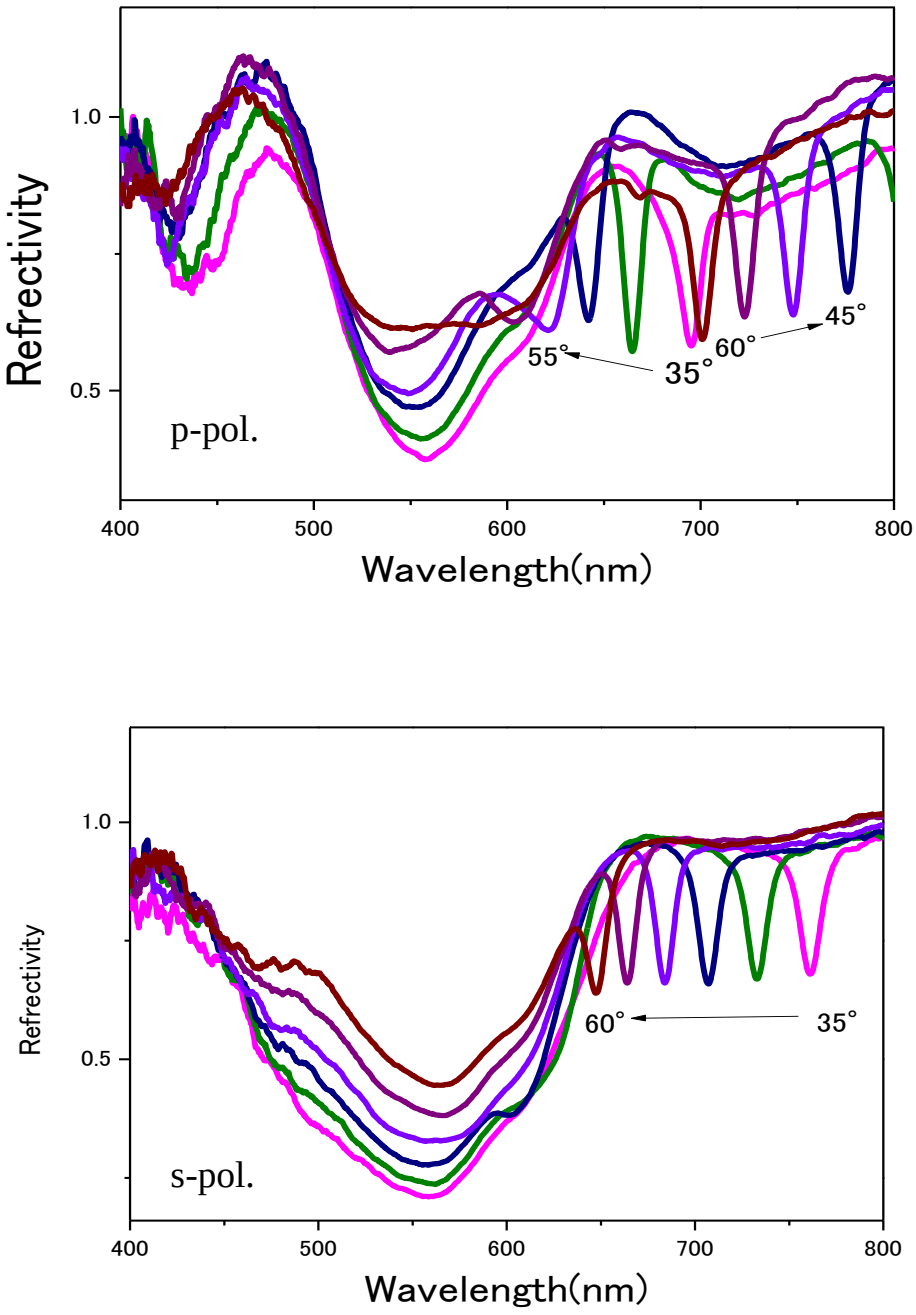

Figure S3. Reflectivity measurements of inverted OSCs by illumination with p-pol or s-pol light for different conditions (with grating, TiO_2: 70 nm)

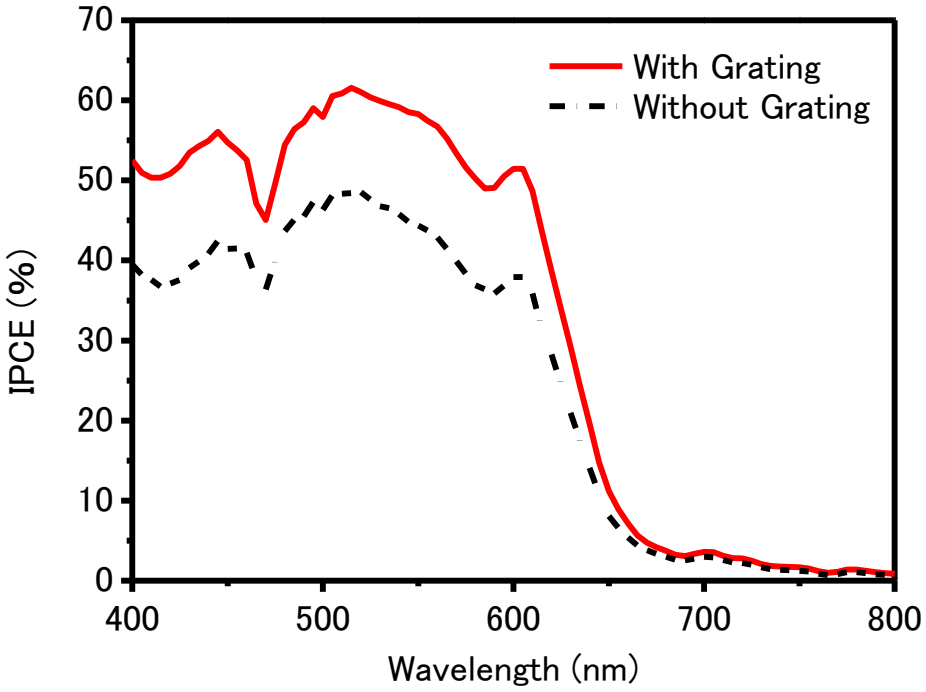

Figure S4. IPCE properties of inverted OSCs without grating and with grating structure.

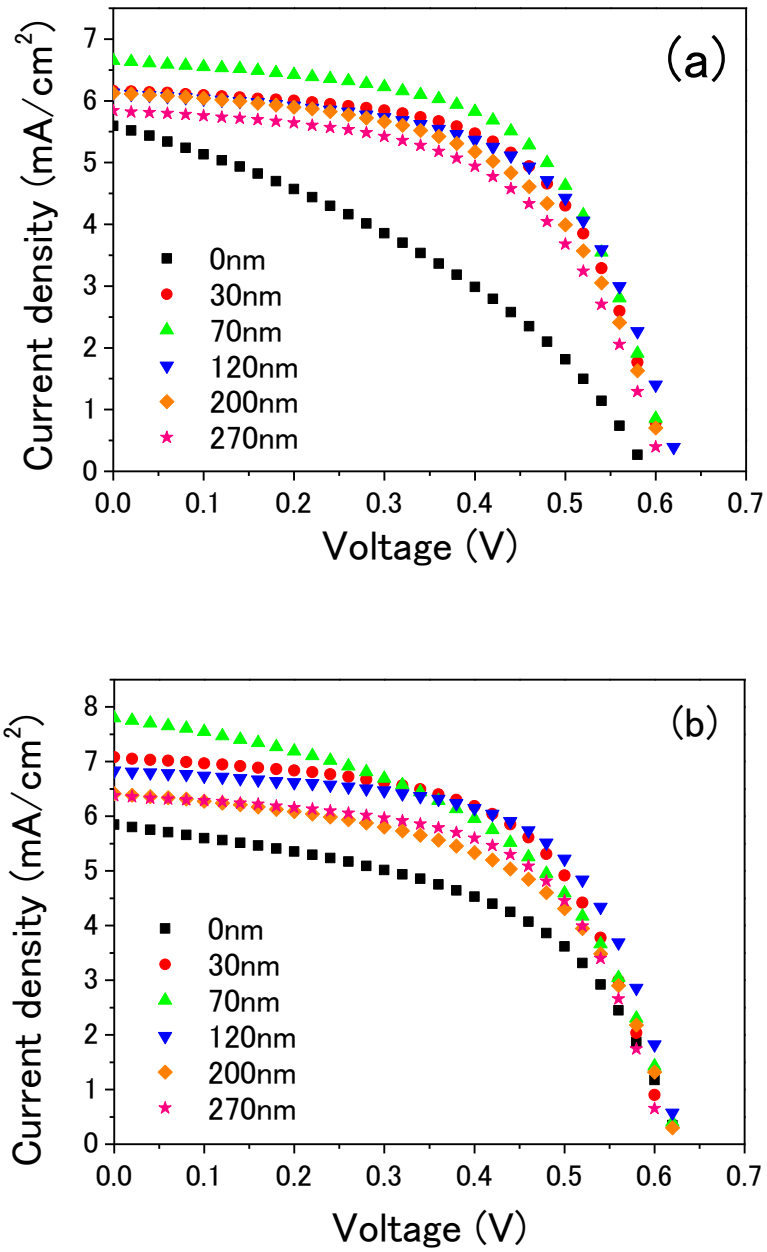

Figure S5. J-V curves of inverted OSCs as a function of TiO_2 layer thickness (a) without grating and (b) with grating structure.

Table S1 The photovoltaic parameters of inverted OSCs as a function of TiO_2 layer thickness without grating and with grating structure.

With grating	0nm	30nm	70nm	120nm	200nm	270 nm
Jsc(mA/cm2)	5.85	7.08	7.80	6.83	6.41	6.37
Voc(V)	0.63	0.61	0.63	0.63	0.61	0.63
FF	0.51	0.63	0.62	0.62	0.60	0.56
Eta(%)	2.50	3.63	4.02	3.53	3.14	2.95
Without grating	0 nm	30 nm	70 nm	120 nm	200 nm	270 nm
Jsc(mA/cm2)	5.59	6.16	6.65	6.13	6.13	5.84
Voc(V)	0.59	0.61	0.61	0.63	0.61	0.61
FF	0.37	0.60	0.60	0.59	0.57	0.57
Eta(%)	1.62	3.04	3.24	3.03	2.84	2.69

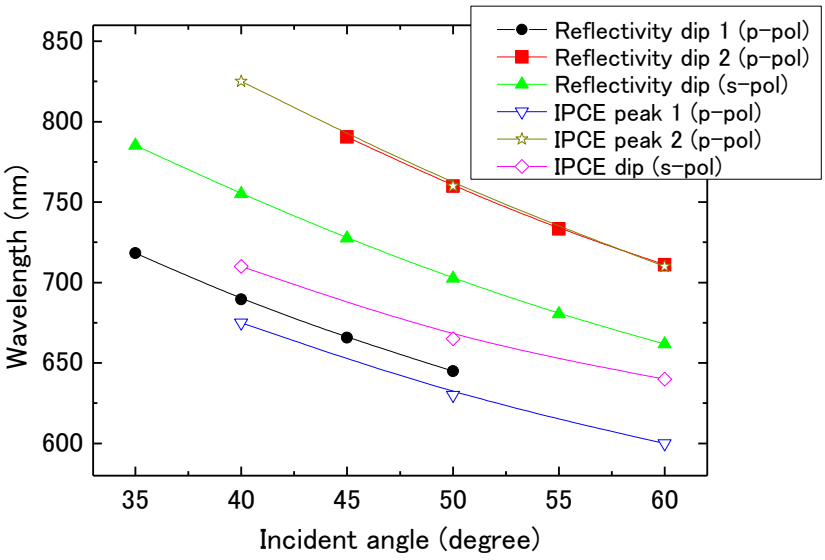

Figure S6. The relationship between the reflectivity dip wavelengths and the IPCE peak and dip wavelengths