

Supplementary Information

s.1

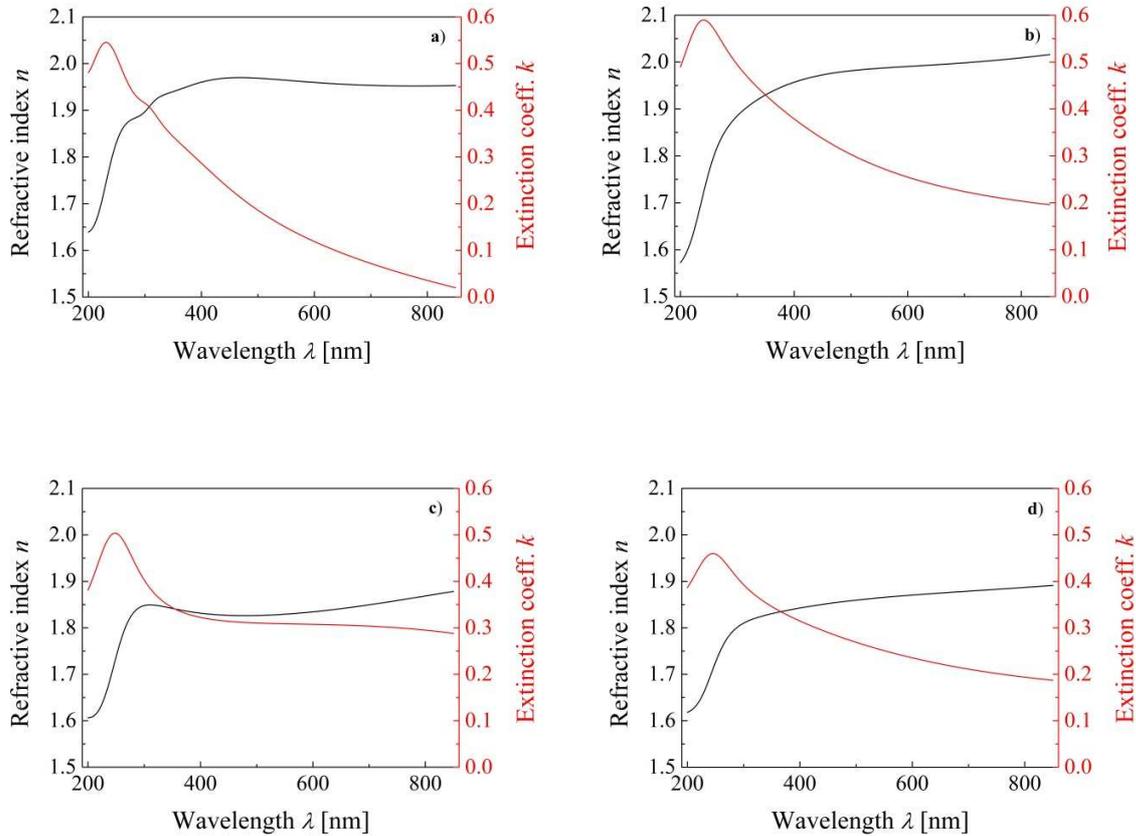


Fig. S1: Dependencies of refractive index and extinction coefficient spectra of a thin film: a) GO, b) the thermal reduced GO, c) the chemical reduced GO and d) UV reduced GO

Table S1: Mean square error of the parameter sample fits

Material	MSE
Graphene oxide	0.020
Chemical reduction of GO	0.013
Thermal reduction of GO	0.014
UV reduction of GO	0.031

s.2: Organic solar cells preparation and characterization:

Pre-patterned glass/ITO substrates were preliminary cleaned in ultrasonic bath firstly in the 5% NaOH solution at room temperature, then rinsed in water and consequently washed twice in deionized water and then cleaned in acetone to remove residual water. Finally, ultrasonic treatment in isopropanol bath was

applied for 10 minutes. First layer, GO (thickness of 5 nm), was deposited by material inkjet printer and then reduced in 3 ways (chemically, thermally, UV).

DPP(TBFu)₂:PC₆₀BM heterojunction layer was deposited on GO/rGO layer by dynamic spin coating dropping 25 μl of the prepared solution on pre-rotated at 2500 rpm substrates for 40 seconds. Thickness of all the active layers measured by the Dektak XT profilometer was in a range of (100 ± 10) nm. Finally, 200 nm Al electrodes were deposited. After that step, to operate the solar cells in the ambient environment, devices were encapsulated with glass slides and Ossila epoxy resin and treated by UV lamp for 30 minutes.

The final structure of the prepared BHJ OSC with a hole-extracting GO/rGO layer (thickness of 5 nm) can be seen in figure S2. OSC with a hole-extracting PEDOT:PSS (instead of GO/rGO) layer was designated as the reference.

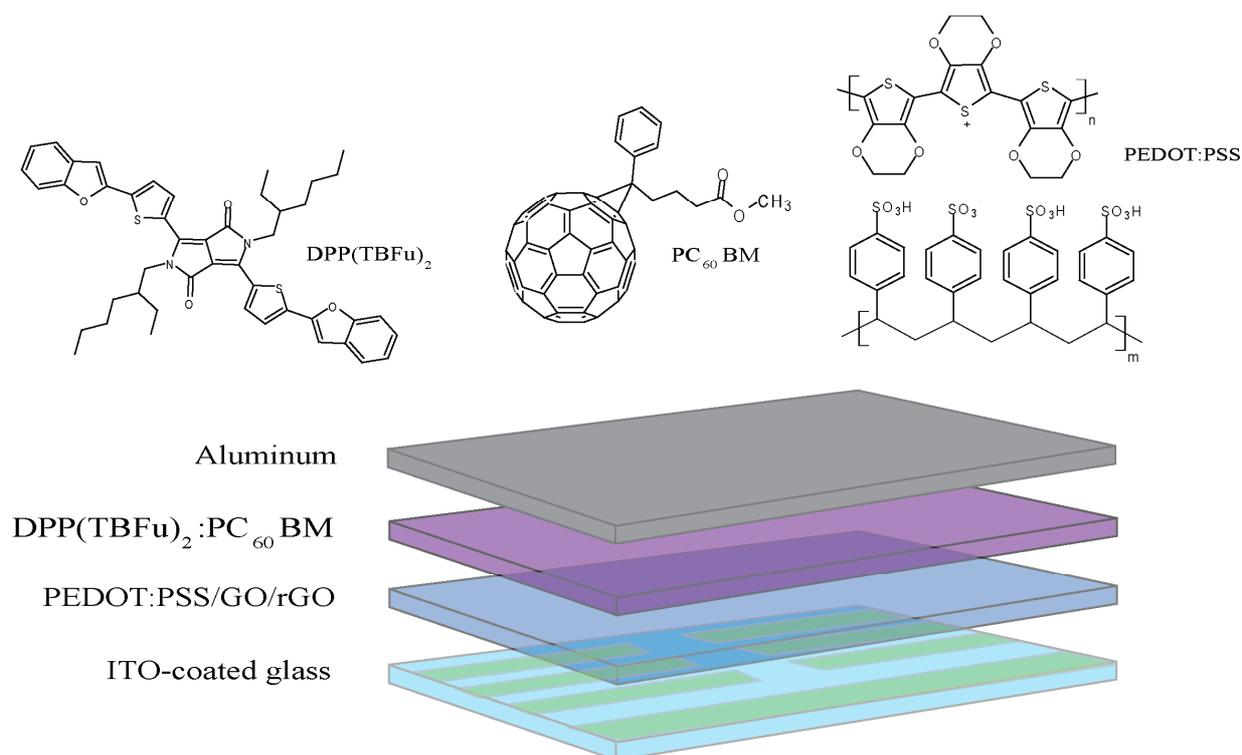


Fig. S2: The final structure of organic solar cells with bulk heterojunction

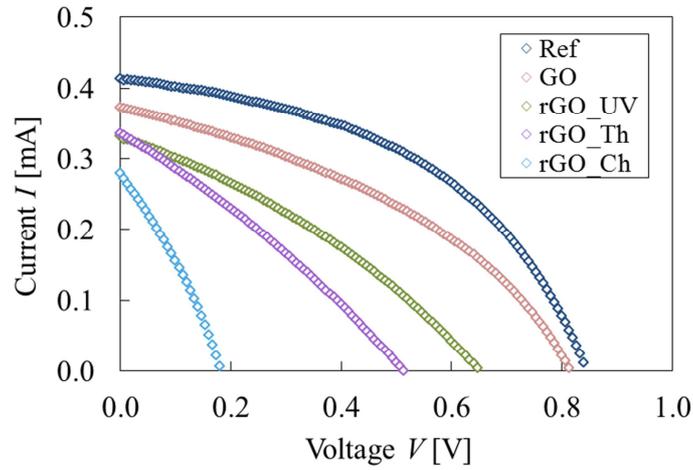


Fig. S2.2: The influence of hole-extraction GO layer and its reduction of I-V characteristics

Table S2: Basic photovoltaic parameters of prepared organic solar cell with bulk heterojunction

Structure	j_{sc} * (mA/cm ²)	V_{OC} * (mV)	FF * (%)	PCE (%)
Reference	8.8	844.3	46.1	3.4
Graphene oxide	8.2	828.0	38.7	2.6
Chemical reduction of GO	7.2	650.8	32.7	1.5
Thermal reduction of GO	7.3	532.2	29.5	1.1
UV reduction of GO	7.0	182.4	30.7	0.4

*short circuit current (j_{sc}), open circuit voltage (V_{OC}) and fill factor (FF)