Supporting Information

For

Graphene Oxide by UV-Ozone Treatment as Efficient Hole Extraction Layer for Highly Efficient and Stable Polymer Solar Cells

Yingdong Xia,[†] Yufeng Pan,[†] Haijuan Zhang,[†] Jian Qiu,[‡] Yiting Zheng,[§] Yonghua Chen,[†,*] Wei Huang[†, //,*]

[†]Key Laboratory of Flexible Electronics (KLOFE) & Institution of Advanced Materials (IAM), Jiangsu National Synergetic Innovation Center for Advanced Materials (SICAM), Nanjing Tech University (NanjingTech), 30 South Puzhu Road, Nanjing, Jiangsu, 211816, P. R. China

[‡]2011 college, Nanjing Tech University (NanjingTech), 30 South Puzhu Road, Nanjing, Jiangsu, 211816, P. R. China

[§]College of Chemistry and Molecular Engineering, Nanjing Tech University (NanjingTech), 30 South Puzhu Road, Nanjing, Jiangsu, 211816, P. R. China

[//]Key Laboratory for Organic Electronics & Information Displays (KLOEID), and Institute of Advanced Materials (IAM), Nanjing University of Posts and Telecommunications, Wenyuan Road 9, Nanjing 210023, China.

Email: iamyhchen@njtech.edu.cn; iamwhuang@njtech.edu.cn

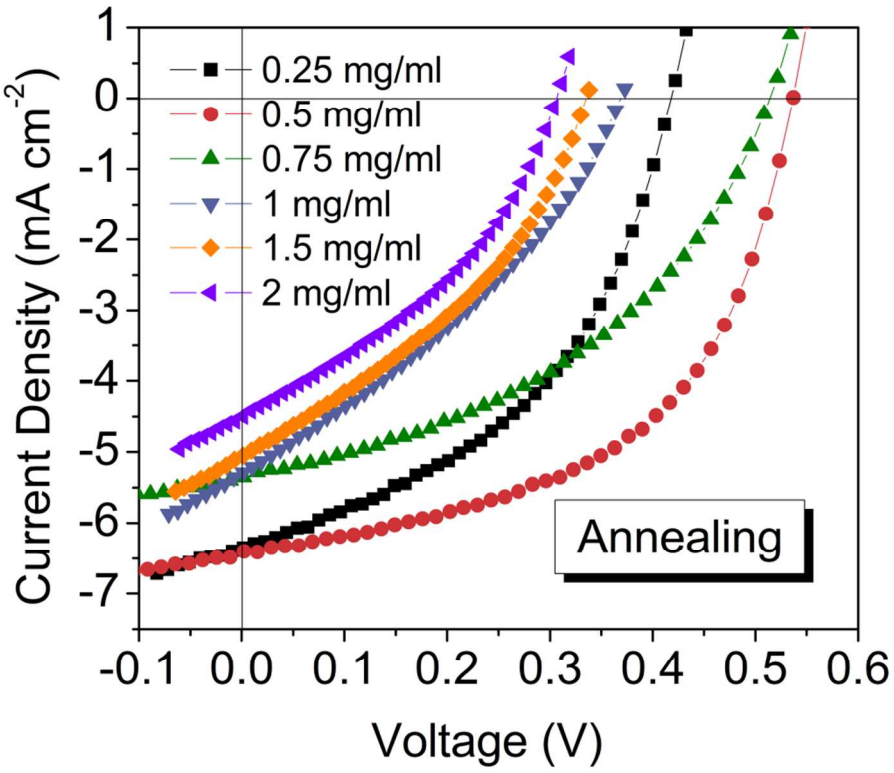

Figure S1. Device performance with different concentration of GO under annealing at 150 °C for 30 min.

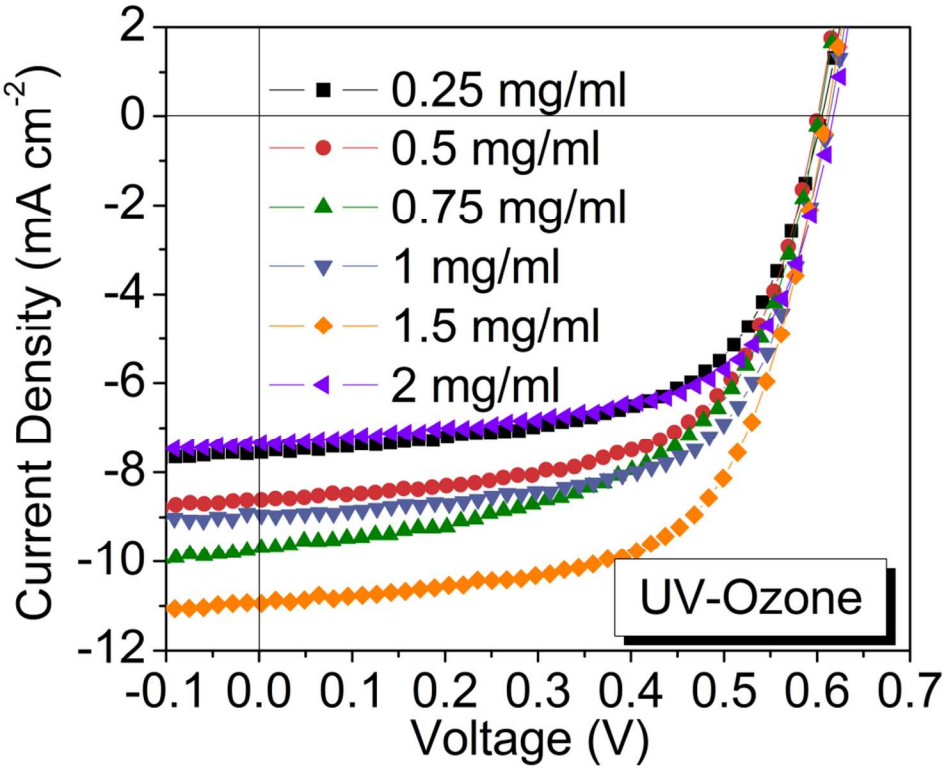

Figure S2. Device performance with different concentration of GO under UV-Ozone treatment for 30 min.

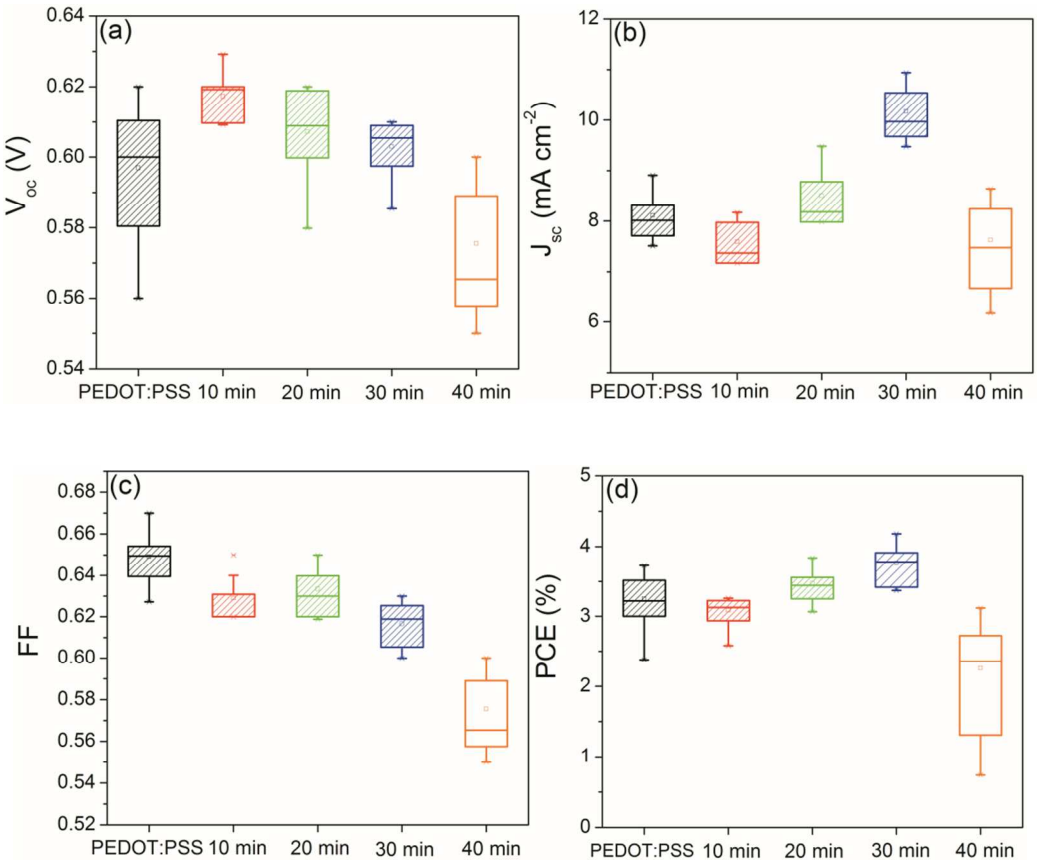

Figure S3. (a) open-circuit voltage (V_{oc}), (b) Short-circuit current density (J_{sc}), (c) fill factor (FF), and (d) power conversion efficiency (PCE) versus different conditions. Error bars represents minimum and maximum values, and the middle line in each box represents the median value. Filled squares indicate mean values.

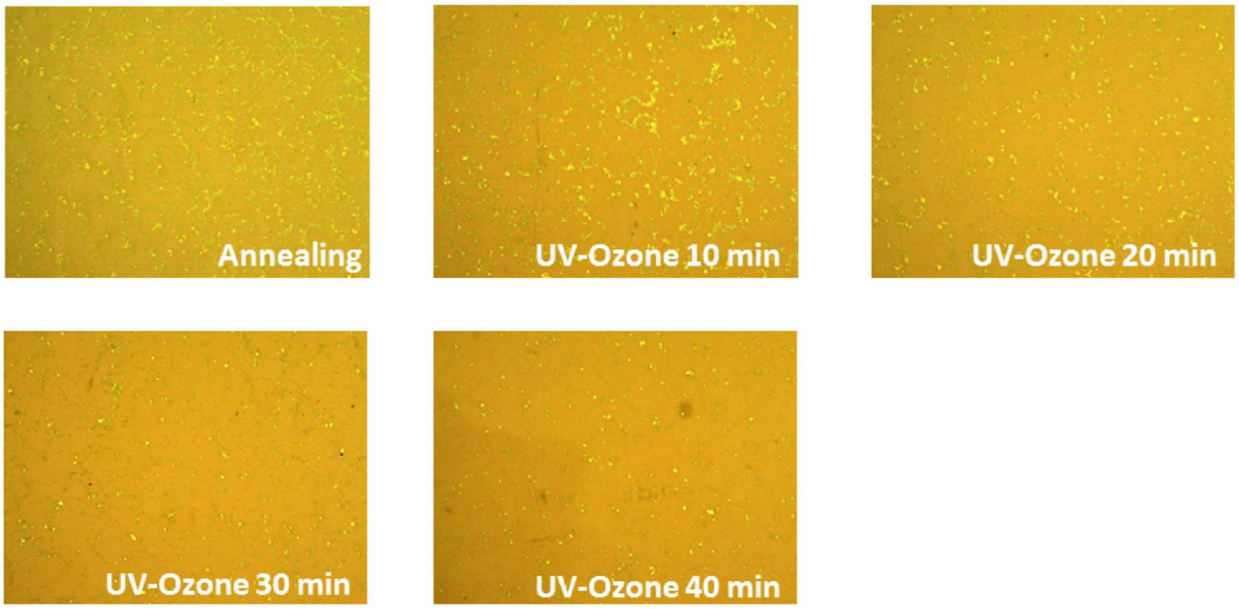

Figure S4. Microscope images of GO on top of ITO glass.

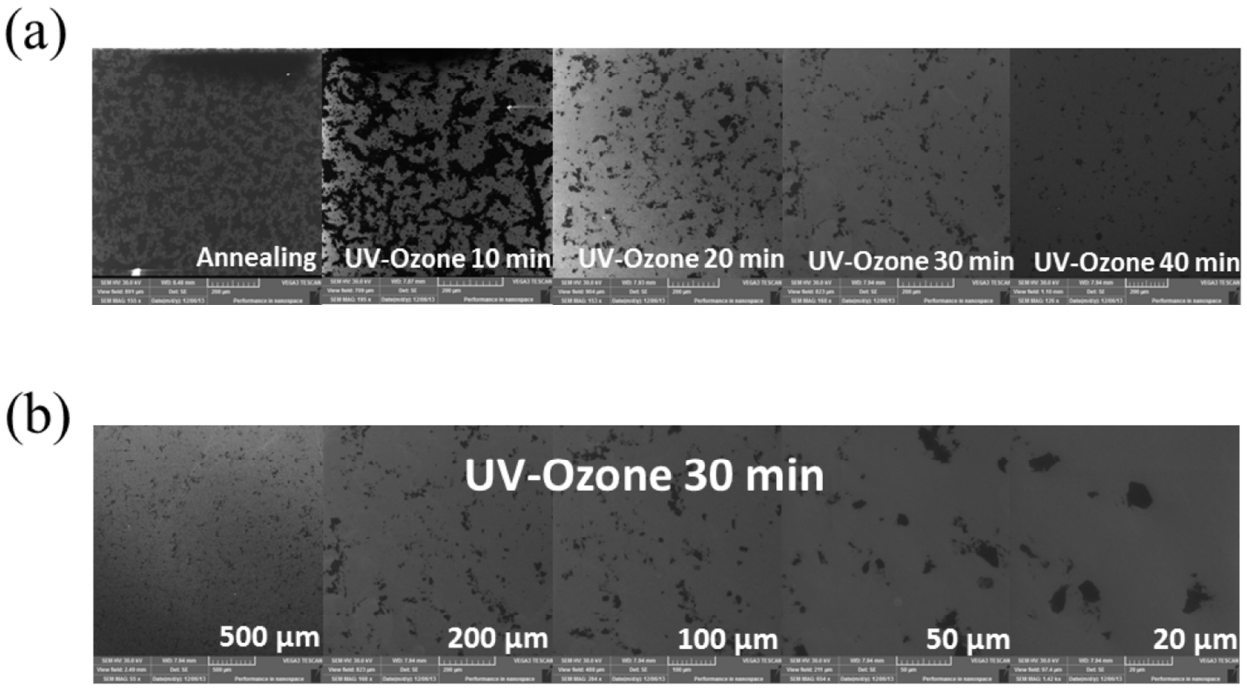

Figure S5. SEM images of GO on top of ITO glass. (a) GO with annealing and UV-Ozone treatment for different time. (b) GO with UV-Ozone treatment for 30 min at different scale.

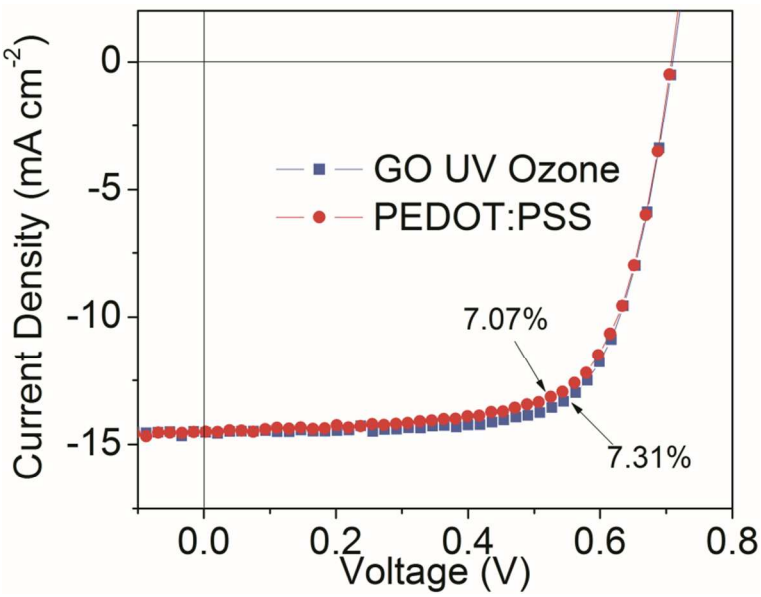

Figure S6. Comparison of J-V curves of devices employing PTB7:$PC_{71}BM$ active layer.

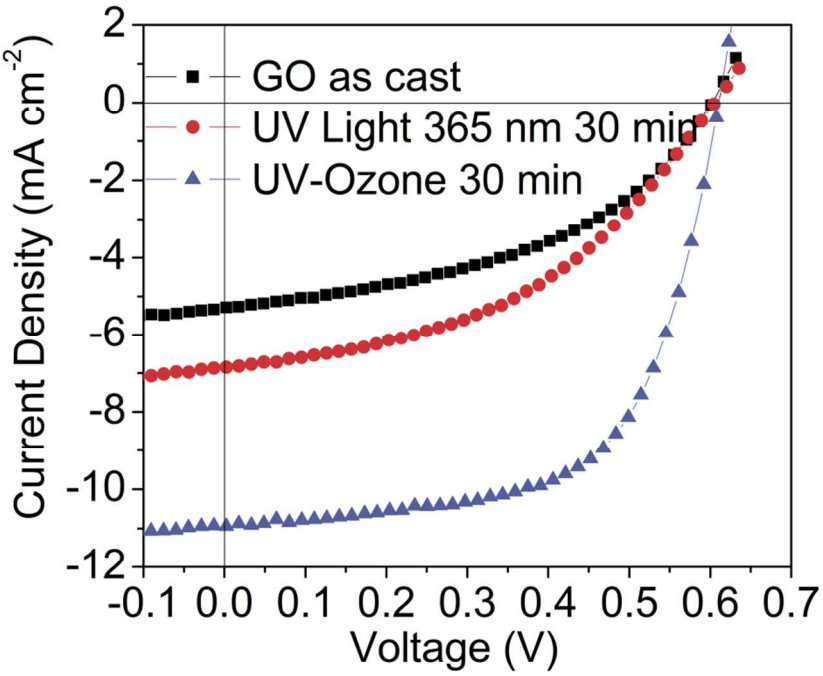

Figure S7. A comparison of device performance with GO as cast, GO under UV light 365 nm, and GO under UV Ozone for 30 min.

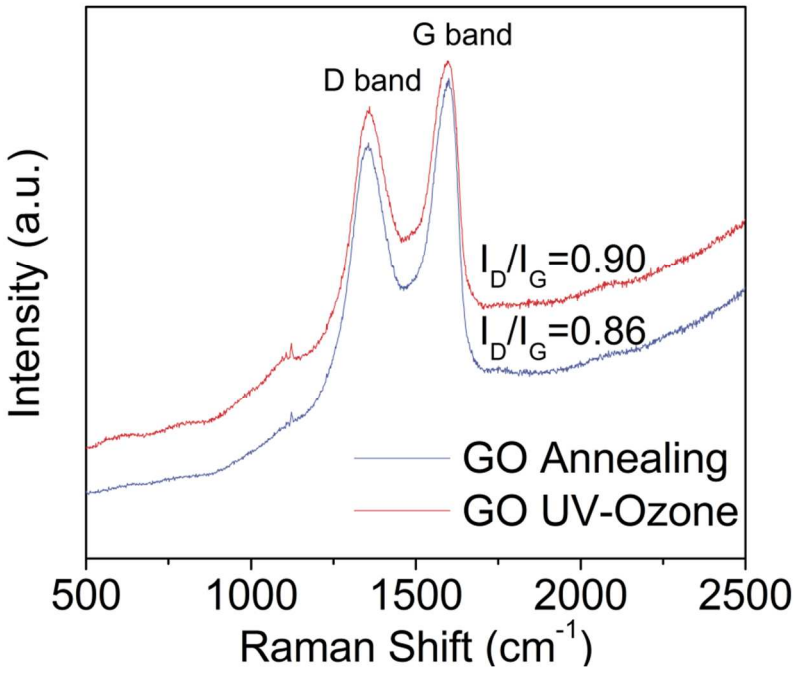

Figure S8. Raman spectra of GO with annealing and UV-Ozone for 30 min.

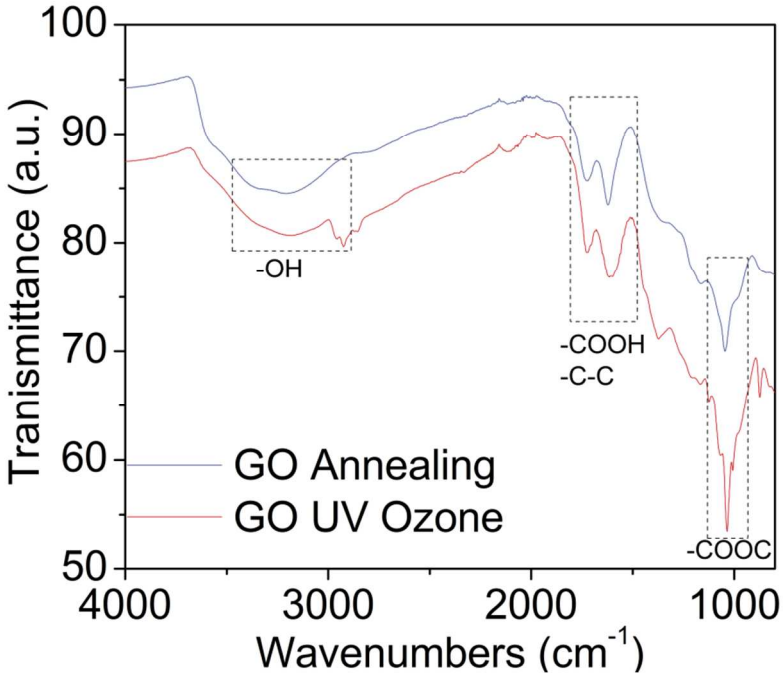

Figure S9. FTIR spectra of GO with annealing and UV-Ozone for 30 min. The FTIR samples was prepared as follows: 1) The GO was dipped coating on top of ITO/PEDOT:PSS substrate; 2) One was annealed for 30 min at 140 °C and the other was treated by UV-Ozone for 30 min; 3) Put the samples into water for 30 min and then get the thick GO films for FTIR test.

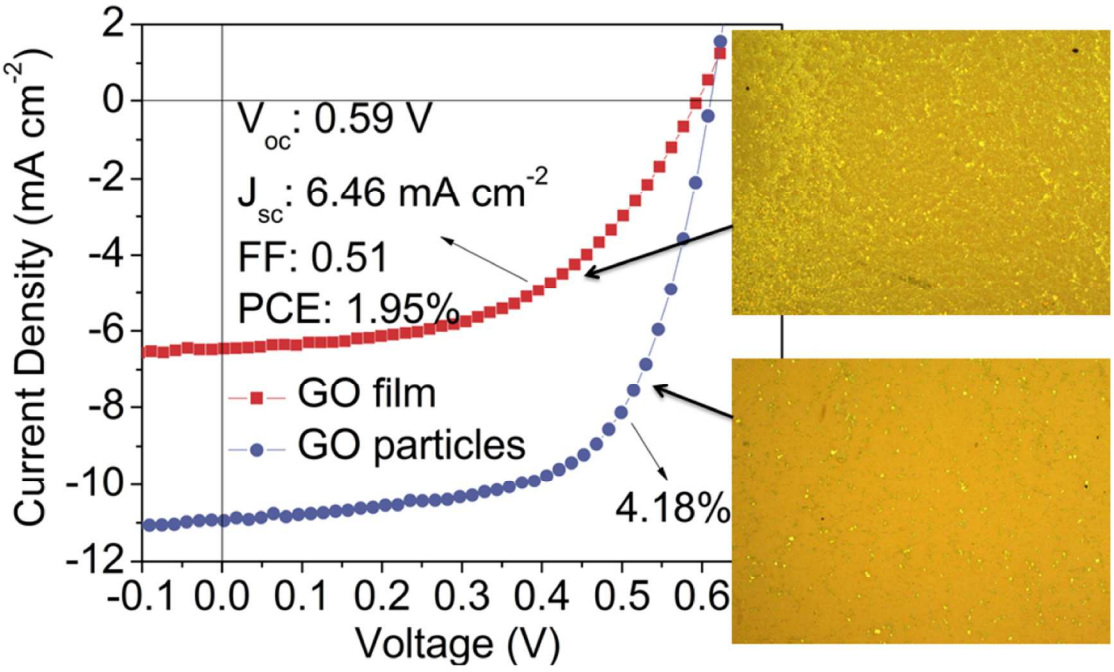

Figure S10. A comparison of device performance with GO film and GO particles under UV Ozone for 30 min. The GO film was prepared by spin-coating for several times from GO solution at 1.5 mg ml^{-1}.

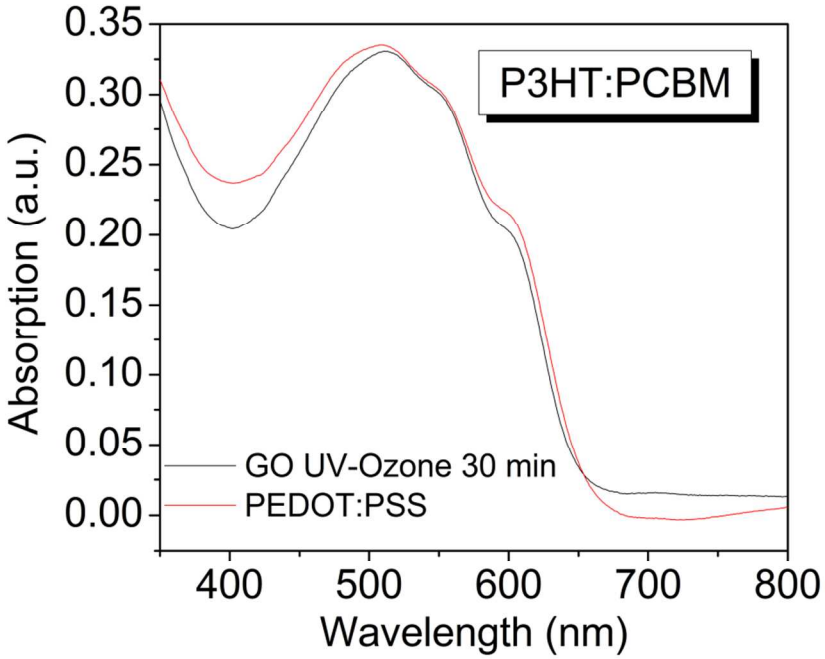

Figure S11. Absorption of P3HT:PCBM active layer on top of GO and PEDOT:PSS.