

Supplementary Information

Penta(organo)[60]fullerenes as Acceptors for Organic Photovoltaic Cells

Takaaki Niinomi,^a Yutaka Matsuo,^{*,a,b} Masahiko Hashiguchi,^a Yoshiharu Sato,^{*,a}
and Eiichi Nakamura^{*,a,b}

^a Nakamura Functional Carbon Cluster Project, ERATO, Japan Science and Technology Agency, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan. Fax: +81-3-5800-6889; Tel: +81-3-5800-6889; E-mail: matsuo@chem.s.u-tokyo.ac.jp; ysato@chem.s.u-tokyo.ac.jp

^b Department of Chemistry, The University of Tokyo, Hongo, Bunkyo-ku, Tokyo 113-0033, Japan. Fax: +81-3-5800-6889; Tel: +81-3-5800-6889; E-mail: nakamura@chem.s.u-tokyo.ac.jp

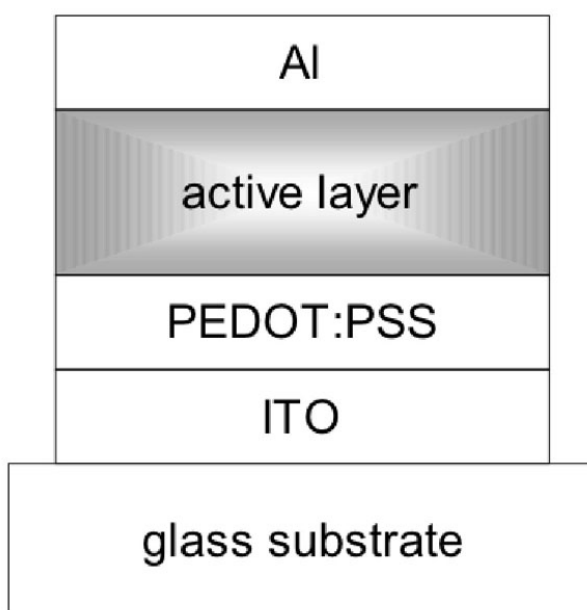


Figure S1. Device structure of BHJ photovoltaic cells.

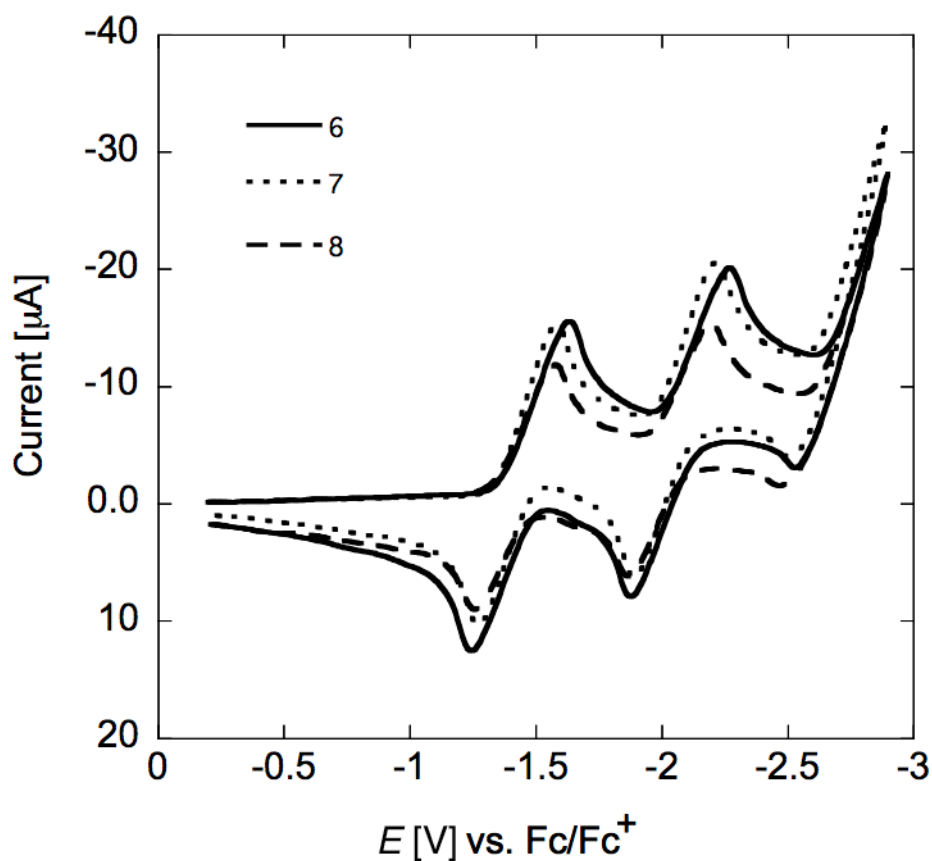


Figure S2. Cyclic voltammograms of fullerenes **6–8** in THF containing $n\text{Bu}_4\text{NClO}_4$ as supporting electrolyte. Working, counter, and reference electrodes are glassy-carbon, platinum coil, and Ag/Ag^+ electrodes. Scan rate: 100 mV/s. Compound **6**: $E_{\text{pc}} = -1.64$ and -2.26 V; $E_{\text{pa}} = -1.24$ and -1.88 V vs. Fc/Fc^+ . Compound **7**: $E_{\text{pc}} = -1.58$ and -2.21 V; $E_{\text{pa}} = -1.26$ and -1.89 V vs. Fc/Fc^+ . Compound **8**: $E_{\text{pc}} = -1.57$ and -2.19 V; $E_{\text{pa}} = -1.25$ and -1.87 V vs. Fc/Fc^+ . E_{pc} and E_{pa} are the cathodic and anodic peak potentials, respectively.

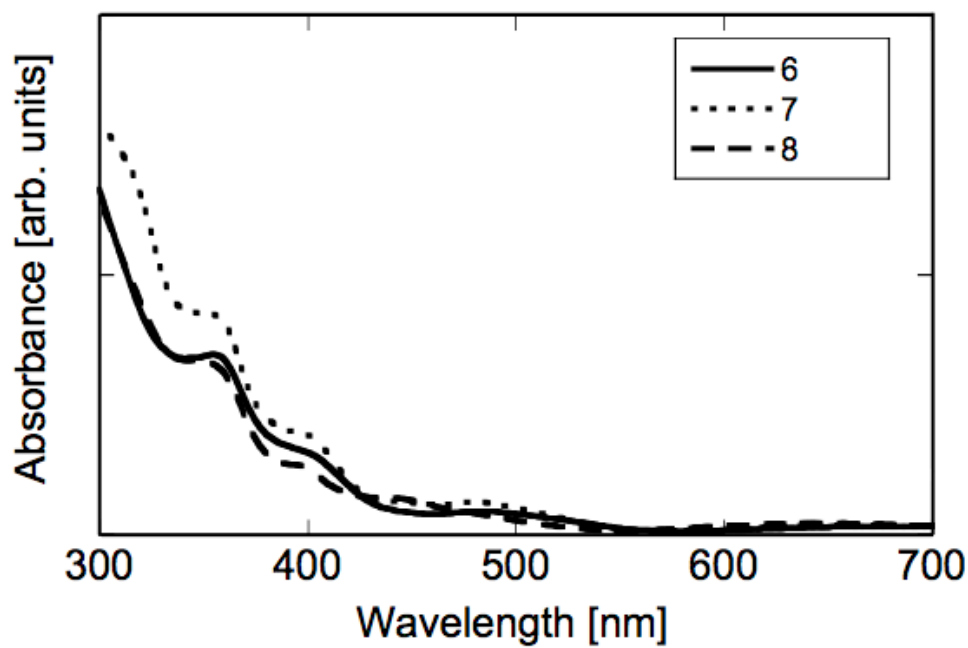
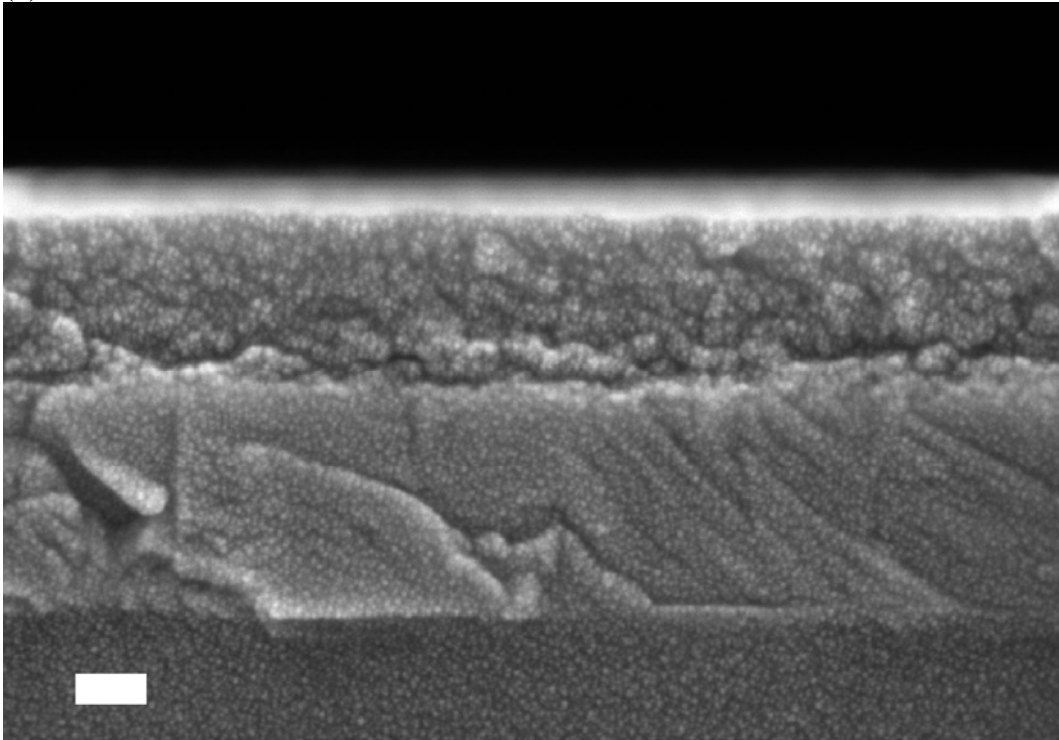
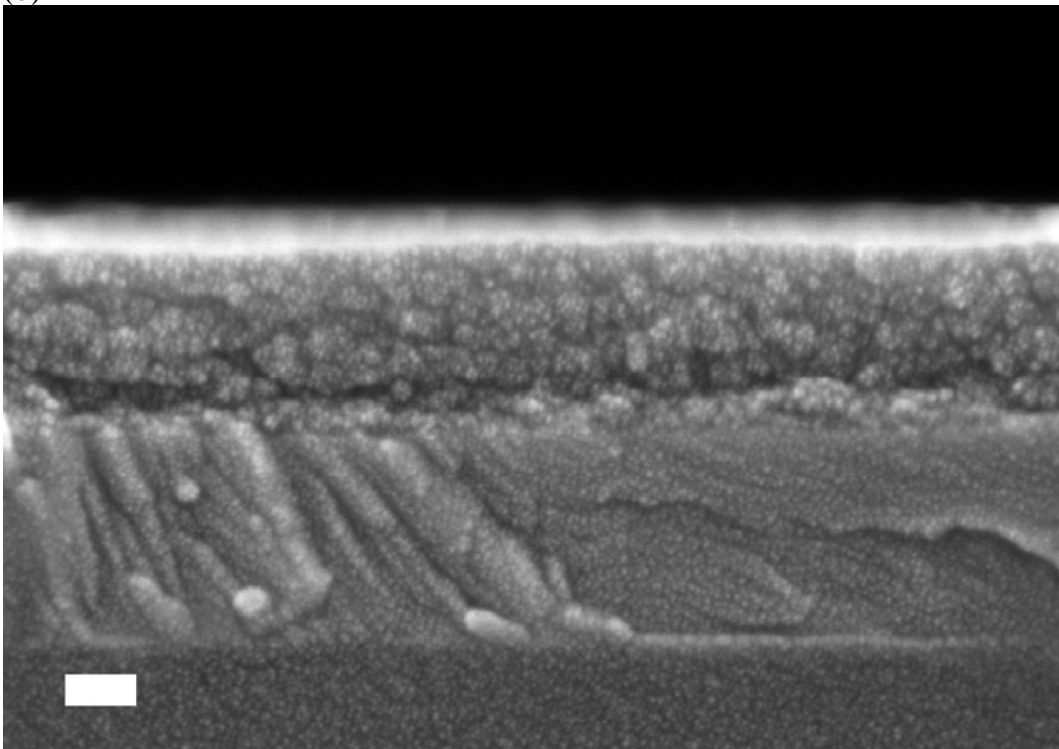


Figure S3. Absorption spectra of the films of fullerenes **6–8**, which have three peaks around at 380, 400, and 500 nm. Each film was prepared by spin-coating of the chlorobenzene solution on the ITO/PEDOT:PSS substrates. Data were recorded by means of the reference (ITO/PEDOT:PSS).

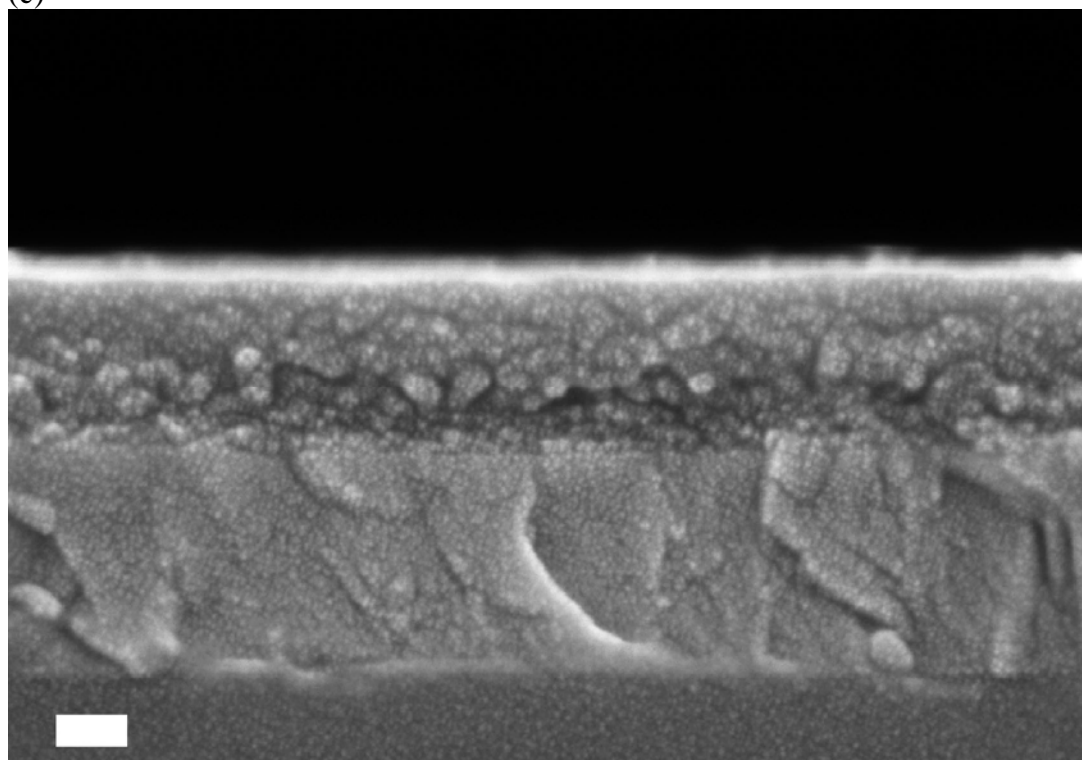
(a)



(b)



(c)



(d)

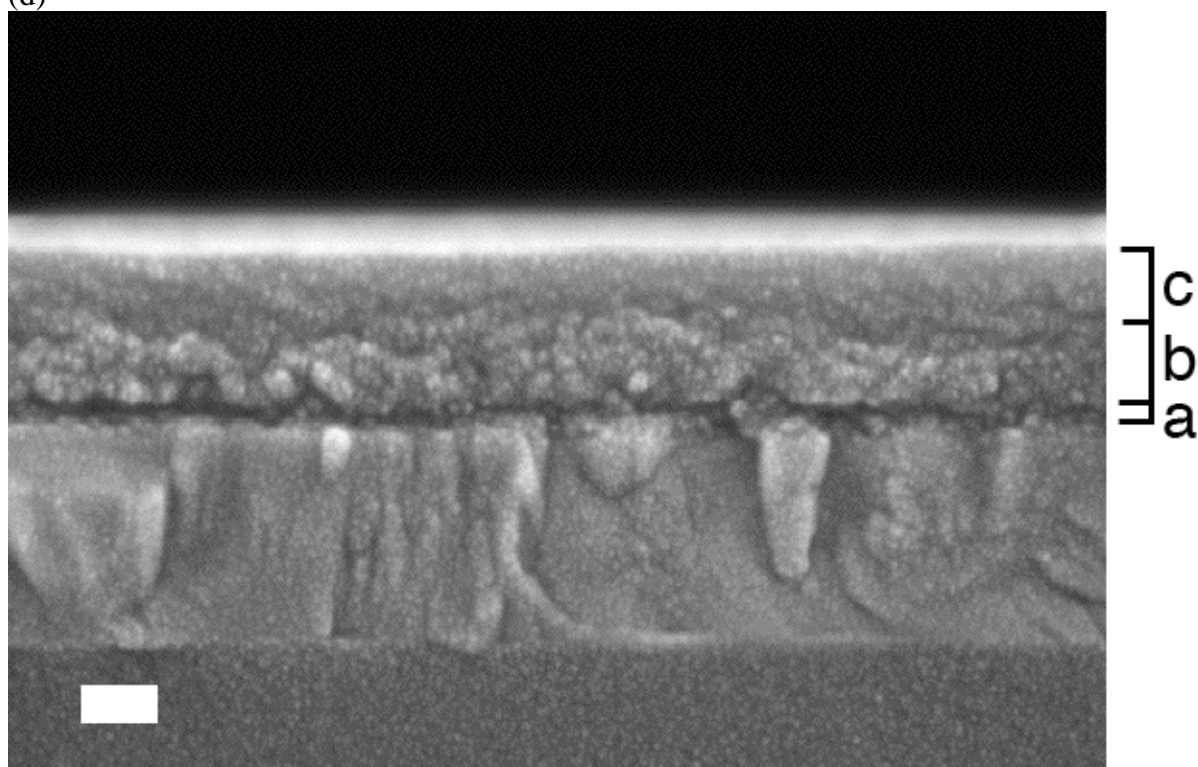


Figure S4. SEM cross section images of the active layers. Scale bar: 40 nm. (a) The P3HT:6 device. (b) The P3HT:7 device. (c) The P3HT:8 device. (d) The P3HT:PCBM device. Layers a, b, and c represent PEDOT:PSS, aggregates ascribed to P3HT, and rather homogenous substance ascribed to PCBM, respectively.