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The Evaluation of Stability and Structure of Organic Solar Cell Using Mixed PCBMIl Jeon, Yoshihide Santo, KeeSheng Yeo, Takafumi Nakagawa, Yutaka Matsuo^{a)}*Department of Chemistry, School of Science, The University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113-0033, Japan***Abstract**

Mixed PCBM, the mixture of PC₆₀BM and PC₇₀BM, as an electron acceptor of organic solar cells (OPVs) is a promising material. It is cheaper than PC₆₀BM yet possess greater durability and similarly good performance owing to its amorphous characteristic and LUMO level, respectively. The bulk heterojunction (BHJ) structure device of P3HT:(mixed PCBM) exhibited 3.23% of PCE (V_{oc} (Open-circuit voltage) = 0.63 V, J_{sc} (Short-circuit current density) = 8.55 mA/cm², FF(Fill factor) = 0.60) in the device configuration indium tin oxide/TiO_x (titanium sub-oxide)/mixed PCBM: poly(3-hexylthiophen) (P3HT)/PEDOT:PSS/Au under AM1.5 G illumination at 100 mW/cm² at the optimized annealing time at 150°C. On the other hand, the PCE of P3HT:PC₆₀BM device was 3.27% (V_{oc} = 0.63 V, J_{sc} = 8.28 mA/cm², FF = 0.63). Under the stability test that we conducted at 150-155°C, the OPV device with mixed PCBM was more stable than that with PC₆₀BM as an acceptor because the morphology change was relatively small. In this experiment, we successfully proved that the OPV device using mixed PCBM, which is blended acceptor is more favorable for the application of organic solar cell than pure PCBM acceptor.

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