

Organic/Inorganic Hybrid Electron-Collecting Buffer Layers for High Efficiency Polymer Solar Cells

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Charge-collecting buffer layers (CCBLs) are considered to play a key role in enhancing the power conversion efficiency (PCE) of organic solar cells (OSCs), because they can help improve the charge transfer toward charge collection electrodes via modification of interfaces. In inverted-type OSCs, electron-collecting buffer layers (ECBLs) are of great importance as they are formed for the first place before making additional layers including light-absorbing active layers. If the ECBLs would be prepared with flaws, overall charge transport/collection characteristics could be inefficient leading to poor PCE. To date, most CCBLs are prepared by wet-coating processes of inorganic metal oxide precursors because of the resulting good charge transport characteristics. However, such good electrical performances can be achieved by high temperature annealing, while the metal oxides are vulnerable to breaking leading to making cracks upon bending. On this account, our group attempted to develop organic/inorganic hybrid CCBLs. In this presentation, our recent efforts on the development of hybrid ECBLs are demonstrated and discussed together with finding of particular nanocrater morphology.