Understanding of Short-Term Stability and Shelf Lifetime in Polymer:Nonfullerene Solar Cells

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Organic solar cells based on polymeric bulk heterojunctions have been extensively highlighted due to their advantages including vacuum-free (wet-coating) low-temperature processes. In particular, these advantageous processes can deliver low-cost plastic solar modules, which are lightweight and ultrathin, as can be manufactured via continuous roll-to-roll fabrications using plastic film substrates. Recently, the power conversion efficiency (PCE) of polymer:nonfullerene solar cells has been reported to reach 16~18% by employing inverted device structures, even though the exact efficiency is necessary to be further confirmed. However, the stability of such high PCE polymer:nonfullerene solar cells is still poor. The reason can be partly attributed to the fact that the nonfullerene acceptors are small molecules etc. In this presentation, the short-term stability and shelf lifetime of polymer:nonfullerene solar cells will be briefly discussed in order to provide the way to advance the actual lifetime of organic solar cells.