

High-Efficiency Organic Solar Cells using Pulsed Laser Deposition

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Abstract

Currently the Titanium oxide (TiO_2) nanoparticles have garnered a lot of researcher interest as electron transport layer material of organic solar cells due to its effect on the efficiency and stability. In this work, TiO_2 nanoparticle powder was deposited by pulsed laser deposition as an electron transport layer in an inverted organic solar cell structure (FTO/ TiO_2 /PTB7-Th:O-IDTBR/ MoO_3 /Ca). The photostability and cell characterizations using the Ossila Solar Cell I-V Test System have been investigated. It was found the power conversion efficiency was over 20% under continuous illumination and for six hours the efficiency dropped from 20.31% to 8.53% under ambient air conditions. The Field Emission Scanning Electron Microscopy (FESEM) image of the cross-section demonstrated the thin film thickness within the nanoscale.