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Realization of flexible polymer solar cell by annealing-free process using 1,8-Diiodooctane as additive

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We fabricated thermal annealing-free polymer solar cells (PSC) by processing with additive and applied to flexible substrates. The 1, 8-Diiodooctane of 3 vol% blended with active solution resulted in enhancement of J_{SC} due to increase of light absorption and hole mobility as improving the crystallinity of P3HT. In addition, the V_{OC} of PSCs with additive was improved by inserting TiO_2 layer without any treatment. The TiO_2 layer prevented the direct contact between active layer and Al electrode and reduced the charge recombination near Active/Al interface. It was confirmed by calculation of J0 and photo-voltage transient measurement. The power conversion efficiencies of annealing-free PSCs using additive for ITO glass and flexible (ITO PEN) substrate were obtained 3.03% and 2.45%, respectively.

Keywords: polymer solar cell, annealing-free process