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Fabrication of polymer solar cells using gravure printing and plasma surface modified nanoscale layer

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In this work the improvement of polymer solar cells is demonstrated by gravure printing and O_2 plasma treatment of indium tin oxide layer. In this paper, it is demonstrated that improvement of polymer solar cells manufactured by gravure printing and O_2 plasma treatment of indium tin oxide layer.

Gravure printing technique has various merits compared with conventional vacuum processes; (1) high throughput controlled stoichiometry of the absorber layer resulting in high process yield, (2) high efficiency of material utilization, (3) low cost of processing equipment, and (4) roll-to-roll production capability of flexible organic solar cells. The combined merits of gravure printing process implies the low cost and high productivity processing of layered nanostructure of donor and acceptor conjugated polymer solar cells.

Using gravure printing, P3HT (poly-3-hexylthiophene) and PCBM ([6,6]-phenyl C61-butyric acid methyl ester) (1:1) conjugated polymer solar cell is produced. And the conversion efficiency of organic solar cells applied by gravure printing technique is enhanced by plasma surface modification of nanoscale indium tin oxide layer to reduce resistance and improve adhesion to active polymer layer.