

# Effects of Solvents on Gravure Printed Organic Layers of Polymer Solar Cells

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Polymer solar cells have recently demonstrated 6% power conversion efficiency (PCE). Even though it has lower efficiency than inorganic solar cells, polymer solar cells are getting attention due to its low cost by simple fabrication processes. Polymer solar cells have the advantage of light weight and compactness. For the commercialization of polymer solar cells, development of printing process is required. Gravure printing process is known to have high throughput and relatively high resolution.

In this work we developed gravure printing process of organic thin films for polymer process. Polymer solar cells were fabricated with gravure printing process and the effect of solvents of gravure printed organic layer was investigated. We controlled thickness and roughness of gravure printed polymer solar cells with various solvents, ratio of solvent mixtures, ratio of P3HT/PCBM. In study of solvent effect, we investigated that thickness and roughness by chloroform, chlorobenzene, 1,2-dichlorobenzene, co-solvent. We observed that change of roughness and properties of polymer solar cells in same condition by ratio of solvent mixtures and P3HT/PCBM. Efficiency of gravure printed polymer solar cells was increased as controlled thickness and roughness by solution. In study of ratio of solvent mixtures, power conversion efficiency of ~3 % was achieved.