

## 유연태양전지 대면적/대량 생산시스템 개발에 관한 연구

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### A study on development of large area/mass production system for flexible solar cell

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Currently, new and renewable energy come into the spotlight, such as solar energy, wind power, fuel cell, hybrid car etc., due to the energy resource is being depleted. Especially, in order to solve like this problem, the study of solar cell manufacturing systems are being extensively researched such as vacuum process. But the major fault of the vacuum process are its expensive production price. On the other hand, Roll-to-roll printing system, the new technology of solar cell manufacturing, has low production price compare with the vacuum process. Also roll-to-roll printing system can decrease the 95% of waste water and 99.9% of harmful gasses than the vacuum process. So we addressed the roll to roll printing system for the flexible solar cell by using printing technology. This roll-to-roll printing system is comprised of various modules, such as web handling module, fine pattern printing module, dry/curing module, uniform coating module and laminating module etc.

**Key words** : Flexible solar cell(유연태양전지), Roll-to-Roll(롤투롤), Printing(인쇄)

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## ESD 스프레이를 이용한 OPV 제작 기법

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### Fabrication Method of OPV using ESD Spray Coating

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PEMS (printed electro-mechanical system) is fabricated by means of various printing technologies. Passive and active components in 2D or 3D such as conducting lines, resistors, capacitors, inductors and TFT, which are printed with functional materials, can be classified in this category. And the issue of PEMS is applied to a R2R process in the manufacturing process. In many electro-devices, the vacuum process is used as the manufacturing process. However, the vacuum process has a problem: it is difficult to apply to a continuous process as a R2R printing process. In this paper, we propose an ESD (electro static deposition) printing process has been used to apply an organic solar cell of thin film forming. ESD is a method of liquid atomization by electrical forces, an electrostatic atomizer sprays micro-drops from the solution injected into the capillary, with electrostatic force generated by electric potential of about tens of kV. ESD method is usable in the thin film coating process of organic materials and continuous process as a R2R manufacturing process. Therefore, we experiment the thin films forming of PEDOT:PSS layer and Active layer which consist of the P3HT:PCBM. The result of experiment, organic solar cell using ESD thin film coated method is occurred efficiency of about 1.4%. Also, the case of only used to ESD method in the active layer coating is occurred efficiency of about 1.86% as the applying a spin coating in the PEDOT:PSS layer. We can expect that ESD method is possible for continuous process to manufacture in the organic solar cell or OLED device.

**Key words** : ESD(정전기력분사), Spray(스프레이), OPV(유기태양전지)

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