High resolution patterning in organic semiconductors

CSIC has developed a new a method for high resolution structural and/or compositional modification in a molecular organic semiconductor film. This method has applications in the production of electronic, optoelectronic and photonic devices, among others.

Industrial partners are being sought to collaborate through a patent license agreement.

An offer for Patent Licensing

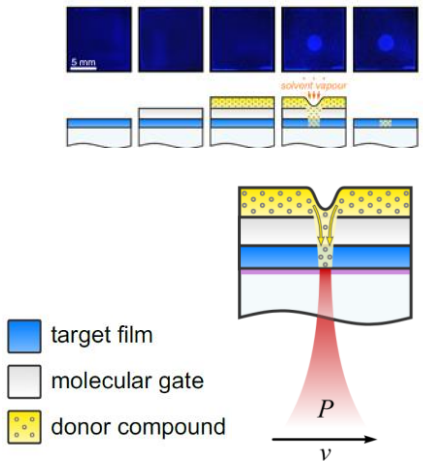
Structural and/or compositional modification in a target film

A key part of fabrication of organic semiconductor active layers involve spatial patterning of material characteristics to enable device-specific functionalities.

State-of the-art methods include photolitography, laser induced forward transfer (LIFT), inkjet, lithography, etc. some of them are fast, some of them have high spatial resolution, neveterless in large areas or roll-to-roll processing those techniques have limitations such as additive or substractive steps, slow multisteps processing, etc. An additional limitation is the fact that several structural features remain unattanaible within one step.

Our method consists on the solution deposition of a molecular gate interlayer onto the target semiconductor layer, followed by a donor layer comprising functional small molecules. Application of a stimulus such as laser light, activates diffusion of the functional molecules into the semiconductor layer through the molecular gate interlayer.

With this new method we can pattern local material composition, electrical doping, chain conformation and chain orientation. More than one feature can be patterned simultaneously. Moreover, we keep the resolution of a light patterning technique and a relatively fast speed.



Molecular gate concept

Main innovations and advantages

- For the first time, local patterning of molecular orientation achieved.
- One step patterning of composition in binary and ternary systems.
- Compatible with high troughput fabrication methods.
- No multisteps for multipatterning needed.
- The throughput of printing methods with the resolution of light-based methods.

Patent Status

European patent application filed suitable of international extension

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