

NANOIMPRINT LITHOGRAPHY FOR ORGANIC NANOELECTRONICS AND POLYMER PHOTONICS*

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The need for accessible, flexible and low-cost nanofabrication techniques is becoming increasingly acute as fast developments in the general field of nanotechnology demand smaller and smaller structures in a variety of materials. It will only be with wide access to low-cost, scalable, flexible and varied nanostructures that the potentials of nanotechnology will be realised in full.

Nanoimprint lithography (NIL), with its apparent simplicity and resolution down to 6 nm, has become a preferred technique for one-level nanopatterning of thin films, which themselves act as a mask for further nanofabrication steps, or which can be used as-printed thanks to the functionality of the thin film itself. In this talk, we focus on the latter approach and report on our tests carried out to fabricate organic (nano)FETs, polymer waveguides of the rib and buried varieties, 1D photonic crystal superprisms as well as to deposit conducting polymers for photodetectors. These examples are illustrated with their characterisation, showing a promising avenue for organic nanoelectronics and photonics.

We discuss the roadblocks for nanoimprint lithography by discussing research challenges and in particular stamps, adhesion, quality control, overlay, critical dimensions and 3D patterning.

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