Analysis of the resist flow during UV nanoimprint lithography

The Laboratoire des Technologies de la Microélectronique has been working since the last decade on the development of Nano Imprint Lithography (NIL) as being a potential alternative technique to the conventional lithographic technologies. In NIL technologies, identical nanostructures can be produced from a master stamp (or mold) over large surfaces coated with thin films of polymers. When the mold is fabricated by e-beam lithography, the patterns resolution in NIL can be as low as 10 nm which gives to this technology a highly interesting potential in terms of low cost and high throughput.

Nevertheless, the suitability of such a technique for microelectronic applications is conditioned by the availability of dedicated equipments with adequate control of pressure, temperature, mold placement and alignment, parallelism between mold and substrates, etc. The first prototypes of such equipments began to be commercially available since few years; the LTM team has recently acquired a NIL Stepper from Electron Vision Group for the purpose of UltraViolet NIL process development.

The open post-doc position aims to address the last and main important issue related to the development of the NIL technology, i.e., the thin film of polymers in which the nanoscale patterns are imprinted. The post-doc candidate is requested to study the impact of the imprinted material mechanical properties on the quality of the imprinted features. More precisely, the flow of low viscosity polymers between the substrates and the stamping tool has to be analysed at the nanoscale level in order to understand the mechanisms of nanocavities filling with the resist and to optimise the imprint process conditions. Experimental approach, as well as numerical simulation using a finite element modelling software, has to be combined in order to perform this study.

The candidate should have a PhD degree in material science, nanofluidics, viscous material flow.

Availability of the position: 1st October 2006
Contact person: Dr Jumana BOUSSEY, jumana.boussey@cea.fr, phone: +33 (0)4 38 78 11 97
Contact type: CDD (limited duration contract: 2 years)
Net salary: 1870 €/month