Low-cost Optical Components Through Nanoimprinting Lithography

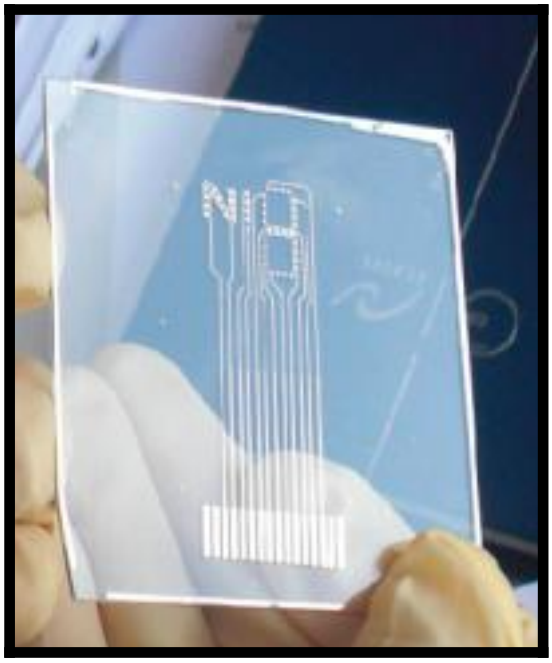
The NaPANIL project at Photonics Europe 2012

The development of new applications based on nanoimprinting techniques (NIL) is evolving at a rapid pace. But what are the challenges to be overcome in order to reach the market? How do we bridge the gap between basic research and its uptake from the industry? What are the tools needed for each product?

The European project NAPANIL deals exactly with this topic, i.e. Nanopatterning, Production and Applications based on Nanoimprinting Lithography. The project, now reaching its end, presented its final results over the last few days at Photonics Europe. The event took place in Brussels from 16 to 18 April and it involved more than 2500 participants from all over the world.

[1]

NAPANIL representation at Photonics Europe followed up on the success of the two NAPANIL industrial days, held respectively in April 2011 and February 2012. Over 2.500 persons attended the world renown event on Photonics, which involved both technical presentations and exhibitions from commercial professionals operating in the most varied fields of photonic sciences.



[2]NAPANIL engaged on two main actions: first, a

special session on NIL for Photonics was selected as a Hot Topic of the Micro-Optics conference series. Several applications of Nanoimprint Lithography were presented here, such as NIL for Pattern Definition, presented by Hella Scheer, professor of Electron Technology, Information and Media Technology at the University of Wuppertal; NIL for Electronic Products, by Philips Research representative Marc Verschuuren; Intelligent Displays for cars, presented by Vito Lambertini from FIAT Research Centre; UV-based NIL for Negative Index Materials, as done at Austrian Profactor GmbH and explained by Iris Bergmair; Metallic Colour Filtering, as presented by Stefan Landis from CEA-LETI; Functional Light Directional Elements, as done at Saint-Gobain Recherche, Swellable Hydrogels for Optical Sensor Structures, jointly performed by the Catalan Institute of Nanotechnology and TECNALIA. Overall, 55 persons attended the session, filling the room during most of the presentations, and participating in the follow-up discussions by posing numerous questions. Thus, the relevance of this technology to the "hot" applications in the current market, such as the automotive, computing, bio ones, was once more proven by this success.

The same success was also reached at the second initiative of NaPANIL at Photonics Europe, i.e. the presentation of the three main demonstrators of the project at the NAPANIL exhibition booth inside the Innovation Village area. The project was in fact among the 16 booths selected for this exhibition initiative to present the latest outputs of the project. Based on the project work plan made at its beginning four years ago, all the three planned demonstrators envisaged there have been developed, and were exhibited at the Innovation Village. These were: an OLED Head-Up Display, developed by FIAT; a Functional Light Directional Element, obtained by Saint-Gobain Recherche, and a Planar Diffactive Optical Element, completed by Modines. More devices and technologies have also come out of the project, and were shown at Innovation Village. Visitors of this area had in fact the possibility to view two eight-inch wafers with nanoimprinted colour

[3]filters obtained by LETI, NIL Technology's recently developed NIL to GO portable imprinting set up and finally the Roll-to-Roll mini portable machine, one of the newest products of Finnish PMT Tec, a spin-off arisen throughout the lifetime of NaPANIL.

Once again, the outputs of the project raised great interest among the visitors, and especially industries and manufacturers of components asked many questions on the advantages of NIL technology in order to evaluate its possible incorporation in their processes. This proved that NIL has a versatile spectrum of applications, which

have been extensively explored in the fours years of this project, an which need further effort to its uptake in the market.

As a conclusion, the evolution in the innovation carried out at European level in NIL is allowing to bridge the gap needed in order to achieve a general uptake by industry. The industrial participants are now willing to exploit this technology in their products and/or activities. Further efforts in this direction are currently being planned as a continuation of NaPANIL.

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