

Polymer Micro/Nano Replication: Micro Injection Moulding and Nano Imprinting

The Manufacturing Engineering Section of the Department of Mechanical Engineering, Technical University of Denmark, in collaboration with with ATV-SEMAPP (Danish Academy of Technical Sciences – Society of Process and Production Engineering, <http://www.atv-semapp.dk/>) and the Polymer group of ATV-SEMAPP (http://www.atv-semapp.dk/atvs_plast_hvem.php) organizes an event Polymer Micro/Nano Replication: Micro Injection Moulding and Hot Embossing with two internationally recognized invited experts:

- Dr. Ben Whiteside, Director of Centre for Polymer Micro Nano Technology, University of Bradford (United Kingdom);
- Dr. Matthias Worgull, Head of Micro/Nano Replication at the Institute of Microstructure Technology, Karlsruhe Institute of Technology (Germany).

Venue: DTU building 306, auditorium 31

Date/time: Thursday, October 23rd 2014, 15:00-17:00



(Program follows in the next page).

15:00 – 15:05 Welcome and introduction (Guido Tosello, DTU Mechanical Engineering, ATV-SEMAPP)

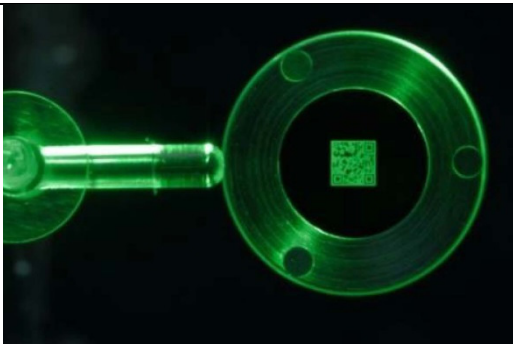
15:05 – 15:50 Invited talk by Dr. Ben Whiteside



“New insight into Micro-injection moulding for improved processes and products”

Dr. Ben Whiteside
Director of Centre for Polymer Micro Nano Technology
University of Bradford (United Kingdom)

The latest development in the field of micro injection moulding for optimized processing and functional polymer micro components manufacture will be presented.



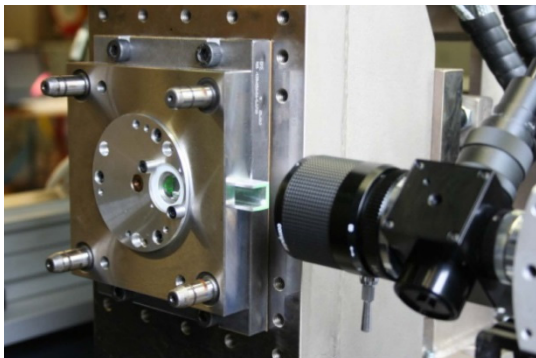
Micro injection moulded micro/nano QR code pattern for anti counterfeit technologies

Dr. Ben Whiteside currently leads the RKT Centre for Polymer Micro and Nano Technology based at the University of Bradford which provides a key resource for Industry working to bring micro and nano scale components to market, alongside internationally recognised pioneering academic research in the field.

Key research areas are: Surface structuring of polymeric devices using feature replication, material-specific behaviour, crystallisation properties and post processes including plasma treatment or embossing.

Product property control using advanced process control and novel materials and material combinations to tailor internal morphology.

Optical characterisation methods for polymer processes including high speed optical and thermal imaging systems.



Flow visualisation apparatus mounted on a micro injection moulding machine

15:50 – 16:00 Coffee break

16:00 – 16:45 *Invited talk by Dr. Matthias Worgull*



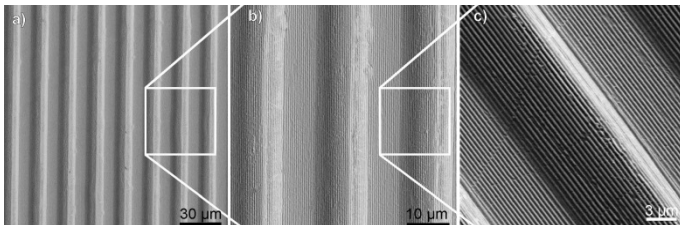
“3D functional surfaces – Methods and materials for nano- and microstructuring”

Dr. Matthias Worgull
 Head of Micro/Nano Replication at the Institute of Microstructure Technology, Karlsruhe Institute of Technology (Germany)

The talk deals with fabrication methods and materials for the large scale replication by modified imprint processes. In the talk applications for optics and biomimetics will be presented.



Large micro structured area produced by hot embossing.



Multi-scale structures produced by nanothermoforming: (a, b) micro optical grating with (c) integrated 400 nm grating.

Dr. Matthias Worgull currently leads the Micro/Nano Replication Group at the Institute for Microstructure Technology at the Karlsruhe Institute of Technology (KIT), Germany. He has been the leader of the Micro/Nano Replication Group at the Institute since 2005. He is author of the book "Hot Embossing: Theory and Technology of Microreplication", published in 2009 by Elsevier Science.

Key research areas are in the field of replication of micro and nanostructures to develop efficient replication techniques.

The work is performed in the two topics of Nano- and Microreplication and Microthermoforming.

The activities in research and development are focused on the following replication processes: Micro Hot Embossing, Nanoimprint, Microthermoforming, Ultrasonic Embossing.

16:45 – 17:00 Discussion and final remarks (Hans N. Hansen, DTU Mechanical Engineering, ATV-SEMAPP)