

# Laser texturing of plastic injection moulding for optical properties

T. Baldi<sup>1</sup>, C. Colominas<sup>1,2</sup>, A. Garcia<sup>1</sup>, R. Garcia<sup>3</sup>

<sup>1</sup> Institut Químic de Sarrià – Universitat Ramon Llull, Barcelona, Spain

<sup>2</sup> Flubetech S.L., Castellar del Vallès, Barcelona, Spain

<sup>3</sup> Microrrelleus S.L., Sabadell, Barcelona, Spain

Texturing can be used to modify surfaces to obtain new physical, tribological or optical properties, such as hydrophobicity[1] or light diffraction.

Laser texturing allows surface patterning, usually at the micro level, although structures at sub-micro level have been reported[2].

This work presents the sub- micro texturing of plastic moulds for massive production of plastic injected parts with functional surfaces.

A fs-laser has been used for texturing 1.2344 steel moulds and parameters such as speed or overlapping of laser tracks have been studied, giving rise to 15 texturing conditions.

Plastic injection tests were performed using polypropylene on all produced patterns. Plastic samples were examined by Scanning Electron Microscopy and Atomic Force Microscopy. Images were finally analysed to evaluate the quality of replication.

Results show that specific laser conditions can be used for the fabrication of plastic parts with sub-micro textured surfaces.

These results might be used for the design of new industrial processes to obtain plastic sub-micro textured parts with functional surfaces.

## References

- [1] C.-W. Yao, J. L. Alvarado, C. P. Marsh, B. G. Jones, and M. K. Collins, "Wetting behavior on hybrid surfaces with hydrophobic and hydrophilic properties," *Appl. Surf. Sci.*, vol. 290, pp. 59–65, Jan. 2014.
- [2] J. Eichstädt, G. Römer, and A. J. Huis in 't Veld, "Determination of irradiation parameters for laser-induced periodic surface structures," *Appl. Surf. Sci.*, vol. 264, pp. 79–87, Jan. 2013.