KN1800

# Surface technology for additive manufacturing with polymers

Andreas Holländer[1], Patrick Cosemans[2]

[1]Fraunhofer IAP, Potsdam, Germany [2]Sirris, Diepenbeek, Belgium

andreas.hollaender@iap.fraunhofer.de

Additive manufacturing (AM) has not only become a wide spread application as 3D printing but it is also considered an important enabling technology. It is about to made the step from the preparation of prototypes to industrial production. AM offers the opportunity to produce components with optimized shape for light weight applications and the individualization of products.
Surface technology has the potential to improve AM technology in various ways. For example, the roughness and the porosity of the surface is a systematic feature of many of today's AM technologies. Surface treatment can help to overcome these issues. In future the additive manufacturing with a combination of many different materials will be required for products which exploit the specific advantages of the particular material at the particular part of the product. In these products surface technology will be required to tailor the interfaces between the materials.
In the presentation we will report about our studies with polymeric products prepared by different AM technologies. In particular we investigated products prepared by selective laser sintering (SLS), stereolithography (SLA), and by fused deposition modelling (FDM). A surface analytical study applying contact angle goniometry and XPS provided some insight in how the preparation technology influences the surface properties of the products. Low pressure plasma and flame treatments were applied for the surface treatments. In particular, the ability of these techniques to penetrate into pores was investigated. Finally, lacquering was applied to make a smoother surface, to close pores, and to provide additional functionality. The influence of the pre-treatments was investigated.

**Keywords**
additive manufacturing
3D printing
polymer
plasma
flame