

3D-PRINTABLE PHOTOPOLYMERS FOR APPLICATIONS IN ELECTRONICS, ENGINEERING AND BIOMEDICINE

Jürgen Stampfl

Institute of Materials Science and Technology, TU Wien, Austria

Lithography-based methods for additive manufacturing of polymers, ceramics and metals enable the fabrication of precise, complex-shaped parts with excellent surface quality in applications like biomedical engineering, electronics and consumer products. Photopolymers contributed 33% to the worldwide materials sales in 2019, thus making lithography-based AM (L-AM) the most widely used AM technology. Although polymers are the dominating material class for L-AM, it is also possible to manufacture composite, ceramic and metallic materials using L-AM.

In order to understand the influence of processing conditions on the finally observed mechanical properties, a fracture mechanical approach will be used. Since AM not only allows to define the shape of a part, but also enables the variation of material properties within the part (gradient materials, digital materials, ...), new routes for a detailed scientific investigation of 3D-printable materials are available.

Additionally, an overview of recently developed 3D-printable materials will be given, allowing to tackle challenges associated with innovative applications in biomedicine, electronics and engineering.