

Compatibility of Additively Manufactured Elastomers with Oils and Fuels

Universität der Bundeswehr München

Institut für
Mechanik

Yvonne Breitmoser

A. Lion, J. Johlitz, S. Eibl, T. Förster



Motivation

In Additive Manufacturing, soft, elastic polymers can be printed in addition to the "classic" solid polymers such as polyamide or PLA (polylactic acid). This enables the production of rubber-like components that can be used as seals or hoses due to their lower hardness. However, to ensure that the systems can be used, they must be tested to see how they behave in contact with media such as oils and fuels.

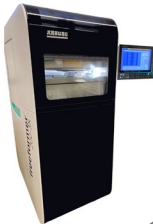
Proceedings

For this purpose, additively manufactured test specimens are immersed in different oils and fuels at different temperatures for different time intervals. In this way, diffusion processes can be investigated, and the time profile of the fluid absorption can be determined. Processes such as fused deposition modeling (FDM), ARBURG Plastic Freeforming (APF), selective laser sintering (SLS) and other methods are used to produce these test specimens.



Additive Manufacturing

- Comparison of print methods
- Filament production for FDM
- Variation of the printing parameters



Mechanical Analysis

- Tensile tests
- Hardness measurements
- Density determination using Archimedes' principle



Sorption Experiments

- Investigation of different elastomers and media
- Influence of temperature and sorption time



Chemical Analysis

- Method development on GC/MS
- Infrared spectroscopy for material identification



Keywords

Additive Manufacturing, ARBURG Plastic Freeforming

Sorption Experiments, Mechanical Analysis, Chemical Analysis

Contact

Yvonne Breitmoser
M. Sc., Research Associate

✉ yvonne.breitmoser@unibw.de

Institute of Mechanics – LRT 4
Faculty of Aerospace Engineering
Bundeswehr University Munich
Werner-Heisenberg-Weg 39
85577 Neubiberg, Germany