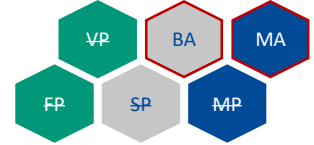


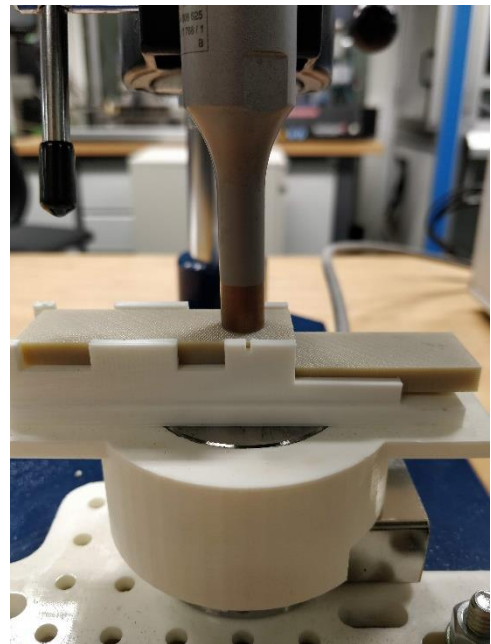
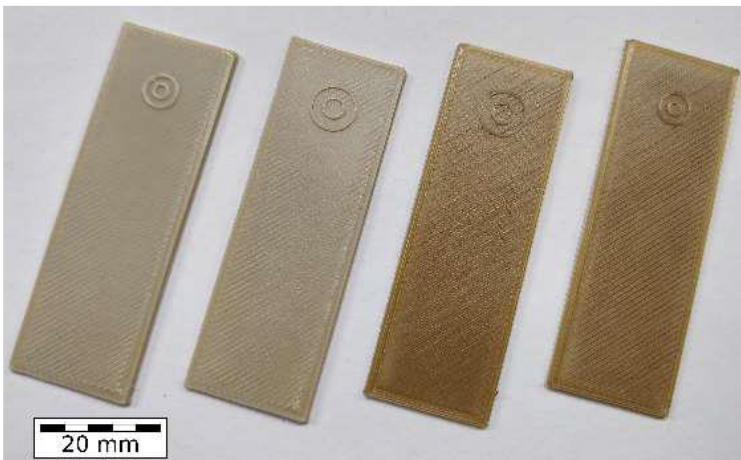
Ultrasonic welding of 3D-printed thermoplastics in a materials circularity framework

Experimental student thesis (BA, MA)*



Recent advancements in additive manufacturing/3D-printing technologies have enabled the freeform structuring of high-performance, recyclable thermoplastics such as PEI and PEEK using fused filament fabrication (FFF). Combining the topological freedom of FFF with the rapid and energy efficient ultrasonic welding (USW) process will allow the fabrication and assembly of large, tailor-made structures with superior mechanical properties, without the need of glue or an interfacial material.

In this topic, we will explore the suitability of USW for additively manufactured adherends, including surface optimization of the 3D-printed specimens, systematic parameter optimization for both the FFF and USW processes and the mechanical evaluation of the resulting US-welded bonds. Additionally, the reusability and recyclability of the thermoplastics will be investigated through, re-extrusion, 3D-printing and mechanical analysis.



[Starts: Q1 2022](#)

[Timeframe: According to examination regulations](#)

[More topics on request!](#)

* FP = Forschungspraktikum, VP = Vertiefungspraktikum, SP = Study Project, BA = Bachelor Thesis, MP = Master Project, MA = Master Thesis

Contact

Dr.-Ing. Bilal Khatri

bilal.khatri@inatech.uni-freiburg.de | 0761 / 203 54 284

Department of Sustainable Systems Engineering | INATECH

Walter und Ingeborg Herrmann Chair for Power Ultrasonics and Engineering of Functional Materials (EFM)

Faculty of Engineering | University of Freiburg

