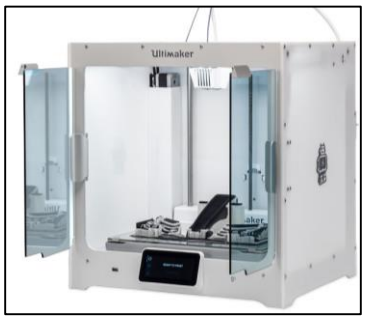
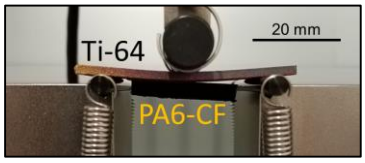
Institute of Materials Science, Joining and Forming
Kopernikusgasse 24/I, 8010 Graz

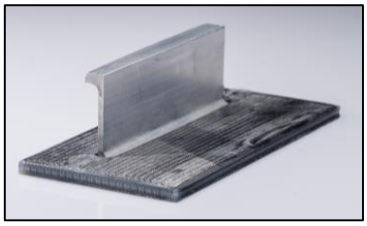
Announcement of a Bachelor Thesis, 15.04.2021

Microstructural investigation of additively-manufactured metal/polymer hybrid joints

Description







The AddJoining is a novel additive manufacturing approach, developed as an alternative to produce layered metal-polymer hybrid structures in substitution to the ones obtained by adhesive bonding and lamination process, such as co-curing and co-bonding, with higher manufacturing flexibility and shorter cycles, out of autoclave and without mechanical fasteners. The process consists in applying Fused-Filament Fabrication (FFF) principles to 3D-print a polymer/composite part directly bonded to a metallic substrate. In this case, one of the most important aspects of the AddJoining is the surface characteristics of the substrate. For the present project, the substrate is comprised by Ti-64 parts produced by Laser-Powder Bed Fusion (LPBF), which are notorious for their relatively high surface roughness. While for many applications this means that the metallic part must be machined, for the AddJoining this feature is rather advantageous, since surface irregularities may induce mechanical interlocking between metal and polymer under adequate circumstances. Therefore, the objective of this project is to correlate microstructural features present at the interface of LPBF Ti-64/PA6-CF AddJoining specimens with their respective process parameters and mechanical performances. The experimental work involved in this project shall be dedicated exclusively to the microstructural analysis, thus involving all sample preparation steps, from cutting to polishing, followed by optical and scanning electron microscopy (OM, SEM).

Organisation

Supervisors: Research supervisor: Carlos Belei, carlos.belei@tugraz.at
Academic supervisor: Univ.-Prof. Dr.-Ing. Sergio Amancio

Duration: min. 3 months

Location: Aviation group, Kopernikusgasse 24/I, 8010 Graz

Further information

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