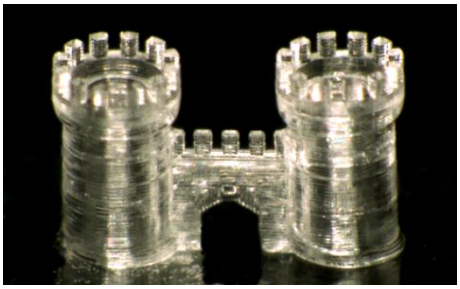
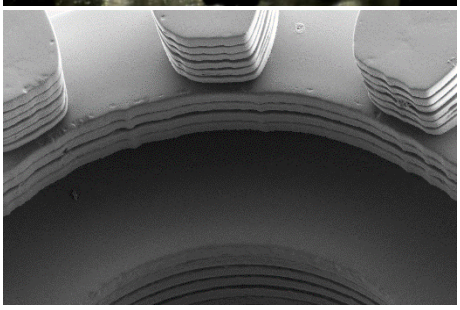
Bachelorthesis, code: surfacefinish

Surface finishing of 3D printed glasses





Glasses are an important class of materials in scientific research, industry and society. Their unmatched optical transparency in combination with their chemical and thermal resistance make glasses ideal for the use in chemical synthesis, optics and photonics or medical applications. However glasses and especially high purity glasses like fused silica glass are notoriously difficult to structure: requiring high-temperature melting or hazardous etching processes.
We have recently developed a new method to fabricate high quality fused silica glass using silica nanocomposites (Kotz et al., Advanced Materials, 2016). Hereby glass nanocomposites are structured like a polymer and then turned into high-quality fused silica glass using thermal debinding and sintering. Using this technology it is for the first time possible to structure fused silica glass using 3D printing but also by high-throughput replication technologies like roll-to-roll replication (Kotz et al., *Nature*, 2017; Kotz et al. *Advanced Materials,* 2018).

However, 3D printing usually creates parts with a rough surface along the printing direction due to the layer-by-layer based process (see Figure). In order to expand this process to the fabrication of optical components like e.g. lenses different surface finishing technologies for the reduction of the printed parts shall be evaluated.

Your work will contain:

1.) Stereolithography printing of glass nanocomposites
2.) Evaluation of different surface finishing technologies for the 3D printed parts
3.) Surface meteorology of the sintered glasses (e.g. AFM measurements, profilometer)

Field of study: microsystems engineering, material science

Qualification: Interest in working in an interdisciplinary team between engineering and material science. Basic knowledge of the fabrication of composites and operating a stereolithography printer are beneficial. If you're interested please sent a letter of motivation, your CV and a list of your academic track record.

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