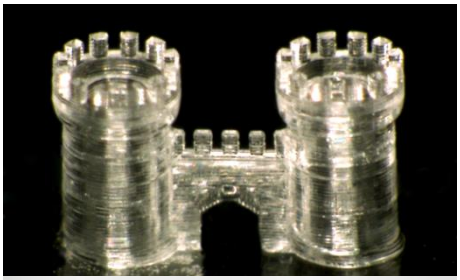
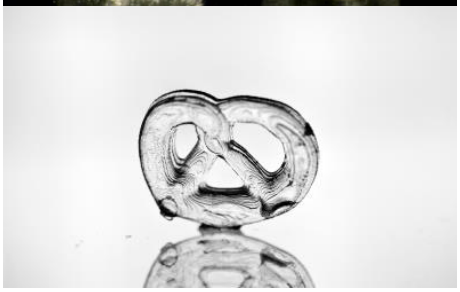
3D printing of multicomponent glasses





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). This novel concept allows for the first time to process glass like a polymer. Using this technology, it is possible for the first time 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).
We are currently expanding this process to 3D printing of multicomponent glasses for applications in life science (so called bioglasses) and optics and photonics. In the course of this project you will be developing novel nanocomposites for 3D printing of multicomponent glasses.
Your work will contain:

1.) Synthesis of multicomponent glass nanoparticles
2.) Development of nanocomposites for stereolithography (e.g. finding appropriate dispersants and monomers for the dispersion of the synthesized nanoparticles, rheological characterization).
3.) Integration of these materials into a stereolithography printer and fabrication of test prints.
4.) Characterization of the sintered glasses (e.g. FTIR, UV/VIS spectroscopy, refractometry, XPS).

Field of study: organic chemistry, material science

Qualification: Interest in working in an interdisciplinary team between engineering, material science and polymer chemistry. Knowledge of organic chemistry is required. Basic knowledge of the fabrication of nanocomposites 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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