

## Master's Thesis

### 3D Printing of siloxane based porous ceramic beads for drug delivery applications

The goal of the proposed thesis is the development of porous ceramic components especially nano-beads by using the blends of preceramic polymers via 3D printing, i.e. specifically additive manufacturing by Stereo Lithography (SLA). SLA will produce flawless, homogenous and precisely reproducible components in an environmentally conscious manner. Upon curing and pyrolysis, the nano-phase composition of the formed amorphous polymer derived ceramic (PDC) will be tailored to enhance their carbon content. The samples, then, will be transferred to etching step, where different sized units (nano-crystals/domains) will be etched resulting in different sized “pores”, so that ceramics with hierarchically porosity will be produced. After detailed structural characterization, the samples will be investigated for hemocompatibility, loading and release capacity for polypeptides as model cargo (drug) molecules, and antimicrobial activity.

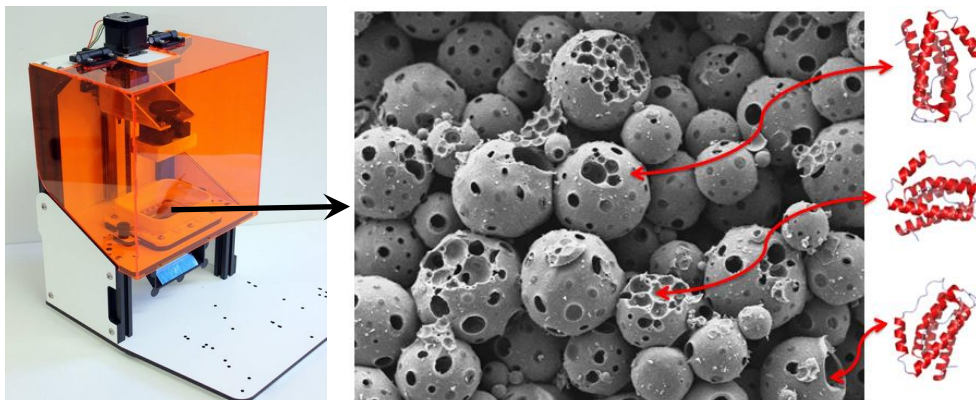


Figure 1.(a, left image) Digital photo of the Stereo Lithography (SLA) 3D printer; (b, right image) Scanning Electron Microscopy image of the formed porous ceramic beads and their proposed drug loading and release process schematic.

**If you are interested please contact Ulla Simon  
([ulla.simon@ceramics.tu-berlin.de](mailto:ulla.simon@ceramics.tu-berlin.de)) or Xifan Wang  
([xifan.wang@ceramics.tu-berlin.de](mailto:xifan.wang@ceramics.tu-berlin.de))**