

Master's Thesis / Bachelor's Thesis / Forschungslabor

3D Printing of silicone based catalysts for photocatalysis

The aim of the bachelor's or master's thesis or Forschungslabor is the development of a polydimethylsiloxane (PDMS, a green and highly transparent polymer material) based photocatalyst with structured macroporosities by a special 3D printing technique called freeze form fabrication. This technology is a combination of FDM (fused deposition Modeling), a 3D printing technique using high viscous slurries/pastes/liquids, and freeze-casting technique to produce anisotropic porous structures. The technique enables the direct production of three-dimensional compounds in an environmentally conscious manner. Directly driven by 3-dimensional CAD data, solutions/pastes are selectively deposited layer by layer and subsequently solidified by freezing in an environment below the freezing point of the solution/paste. The process is followed by the sublimation of the solvent by freeze-drying. Thus, additional pores in the struts and thus additional surface area is generated which makes this process interesting for applications in catalysis.

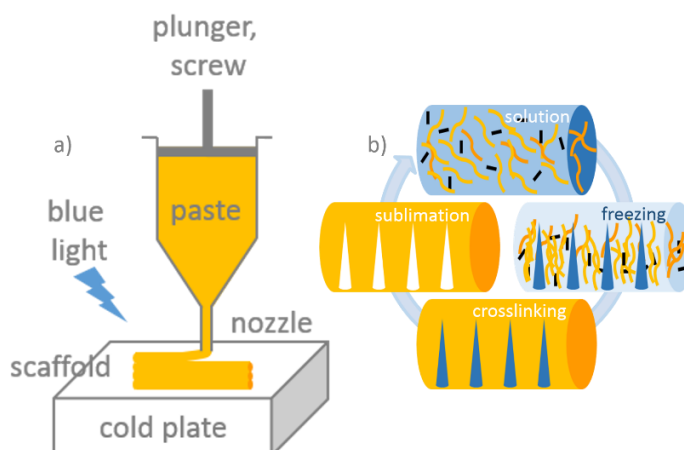


Figure 1. Freeze Form Fabrication Process. A) Schematic of the technique; b) Schematic of the processes involved.

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