Master Thesis

Synthesis and Characterization of Polymer Brushes with Subsequent Enzyme Immobilization

at the Institute of Technical Biocatalysis (TUHH)

Introduction

Recently, additive manufacturing is gaining interest, due to its big advantages in terms of faster production, as well as the borad range of material used. This makes additive manufacturing a promising technique for biocatalytical processes, where traditional enzyme carriers can be replaced by additively manufactured packings. Nevertheless, the smooth surface of these structures limits the amount of enzyme to be immobilized. Hence, the aim of this work is to increase the surface area of additively manufactured packings by synthesis and fixation of polymer brushes and a subsequent proof-of-principle for enzyme immobilization.

Aim

Polymer brushes are chain-like structures, that can be grown from surfaces, such as silica. Within the synthesis and characterization of polymer brushes significant parameters (brush density, molecular weight, etc.) of the production process have to be determined and adapted. Subsequently, a proof-of-concept for enzyme immobilization via an already established method, will be conducted and optimized.

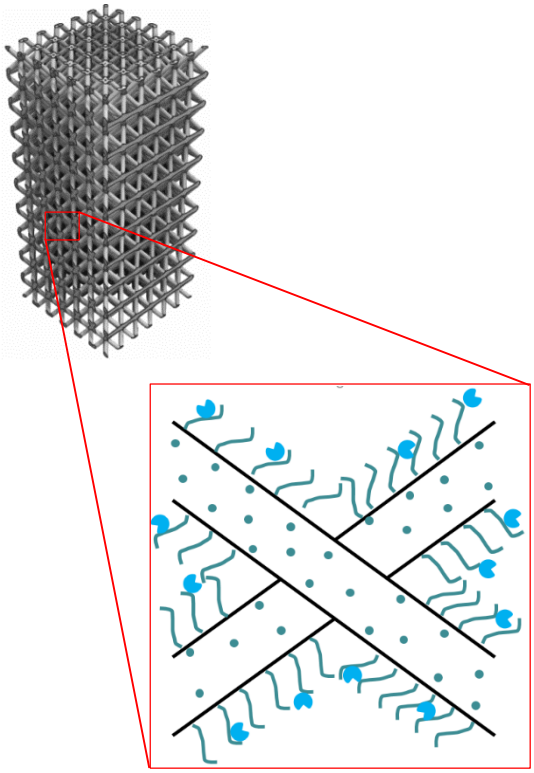

Figure 1 An additively manufactured packing, with ficed polymer brushes and immobilized enzymes.

Start: immediate

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