

Immobilization of proteases on magnetic micro-particles for the application in peptide synthesis

Julia Stolarow^{1*}, Christoph Syldatk¹, Rudolf Hausmann²

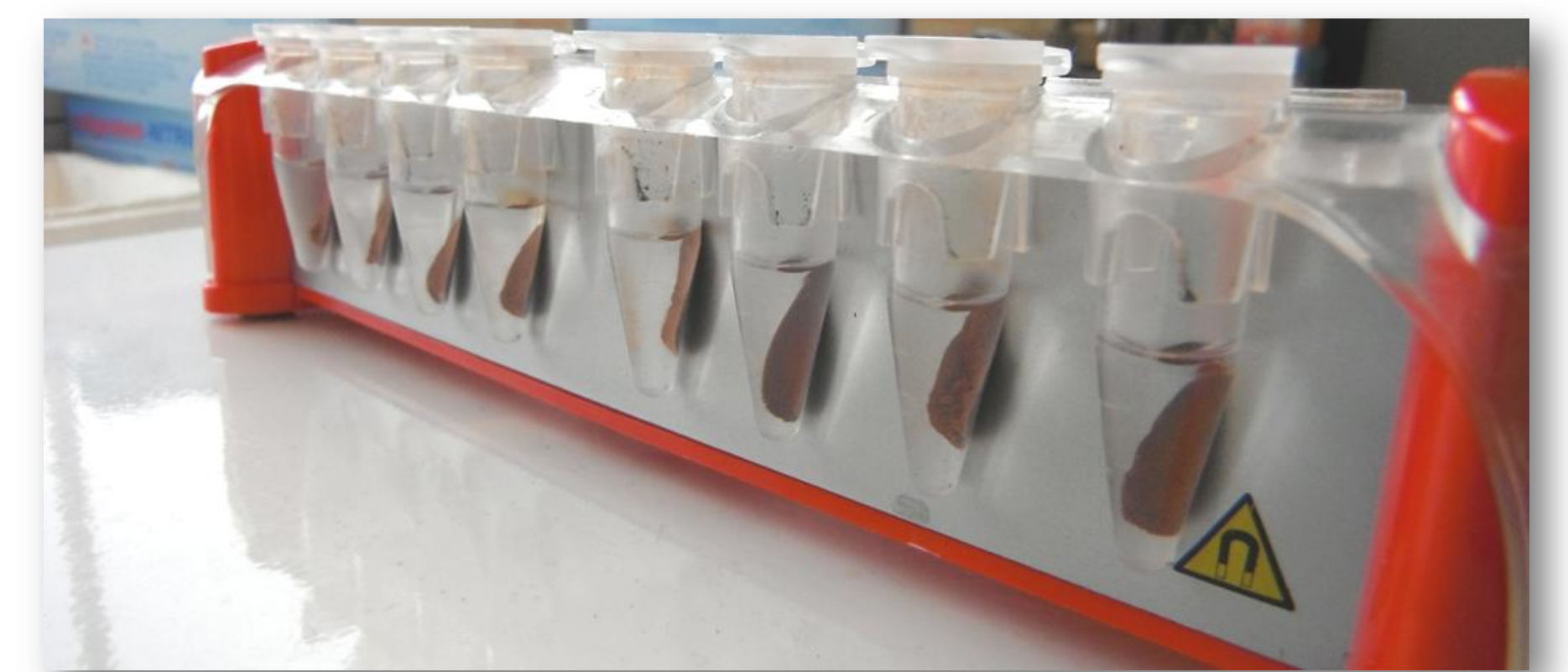
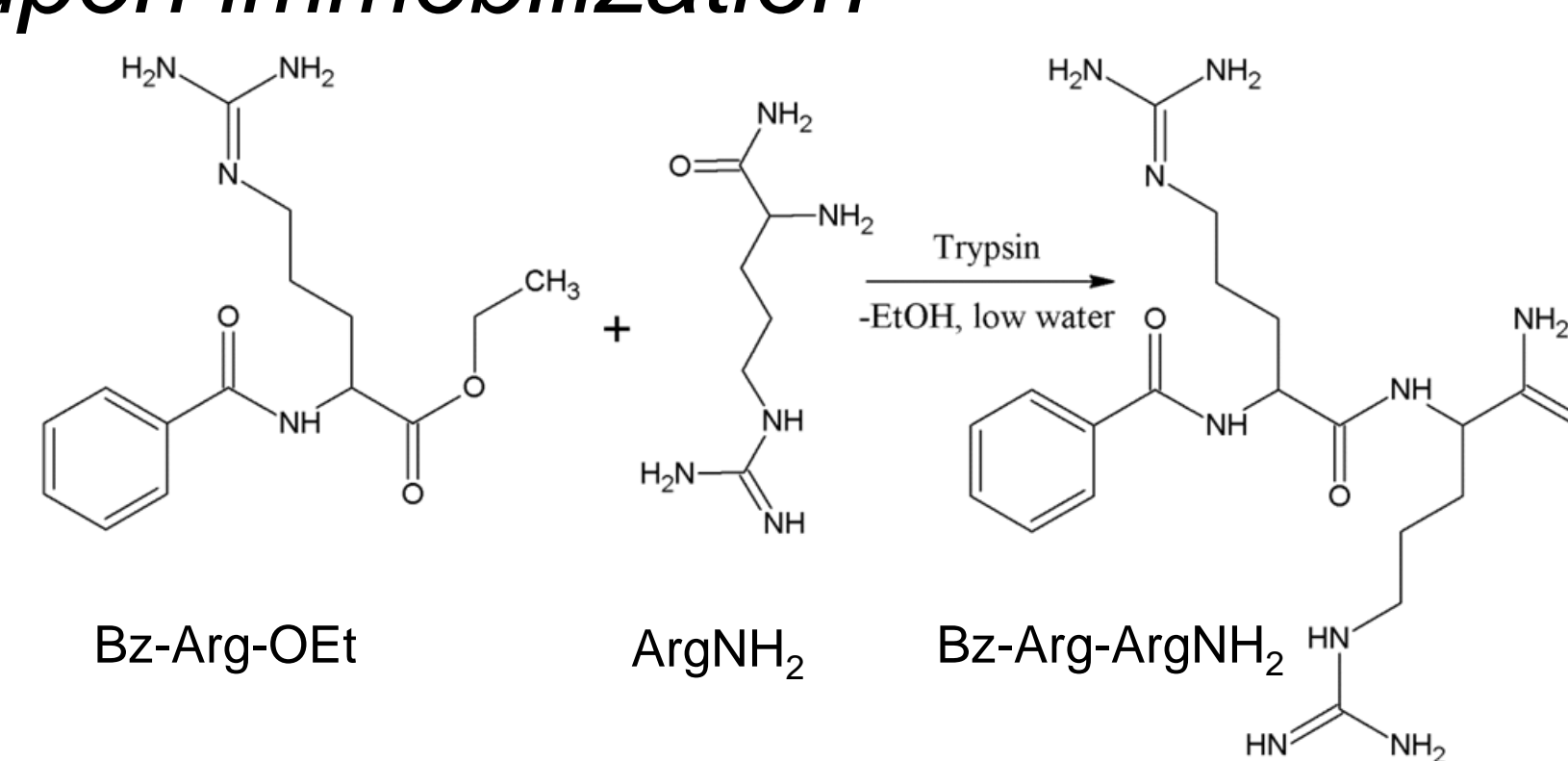
¹Karlsruhe Institute of Technology, Karlsruhe, Germany; ²Institute of Food Science and Biotechnology, University of Hohenheim, Stuttgart, Germany

*Julia.Stolarow@kit.edu

Introduction: The immobilization of enzymes is a suitable technique for biocatalyst reuse and stability improvement. A major challenge of this process is the loss of initial enzymatic activity upon covalent binding. This may be a result of different phenomena.

- mass transport limitation
- loss of active conformation upon immobilization
- steric hindrance

Model reaction: Dipeptide synthesis by trypsin

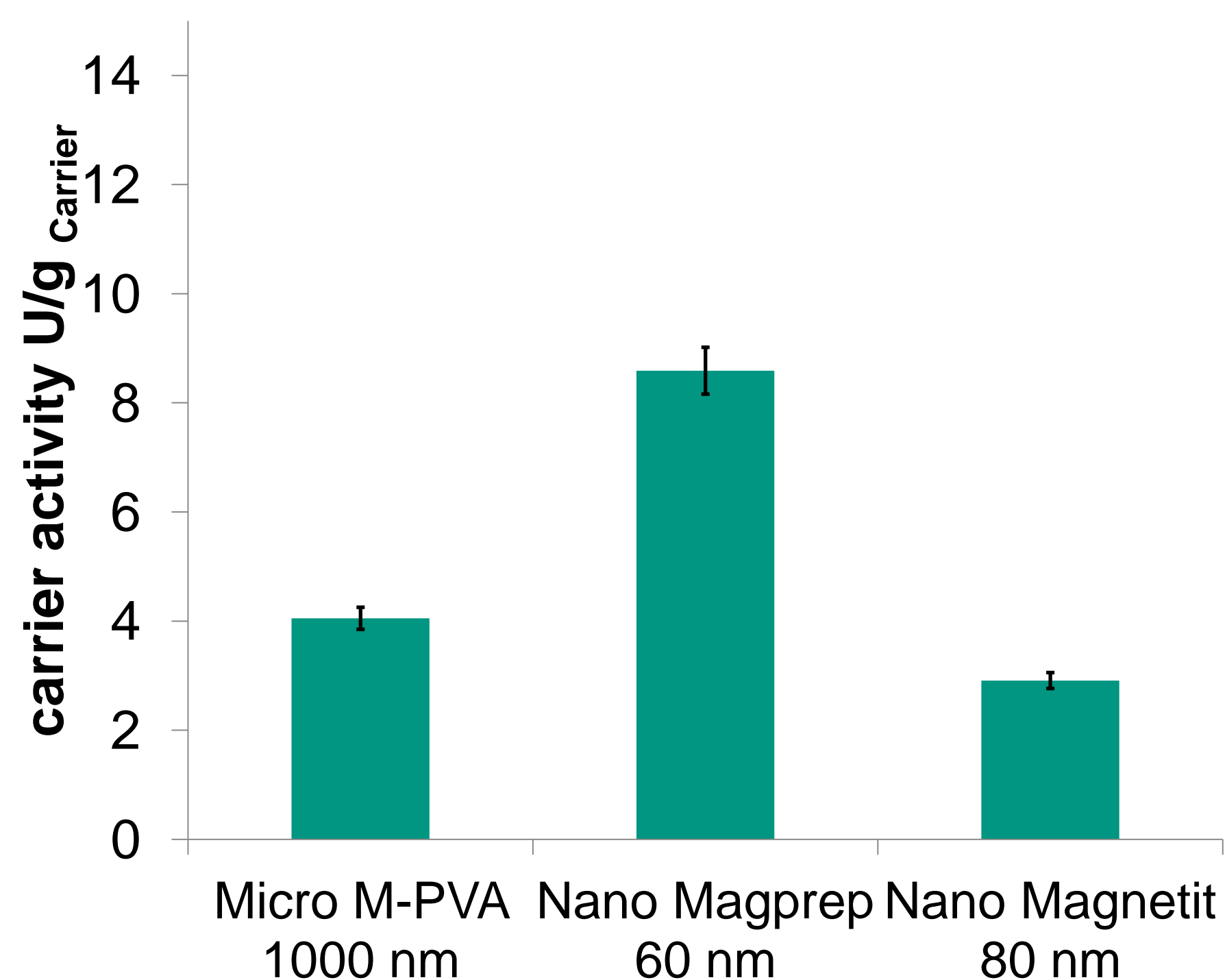
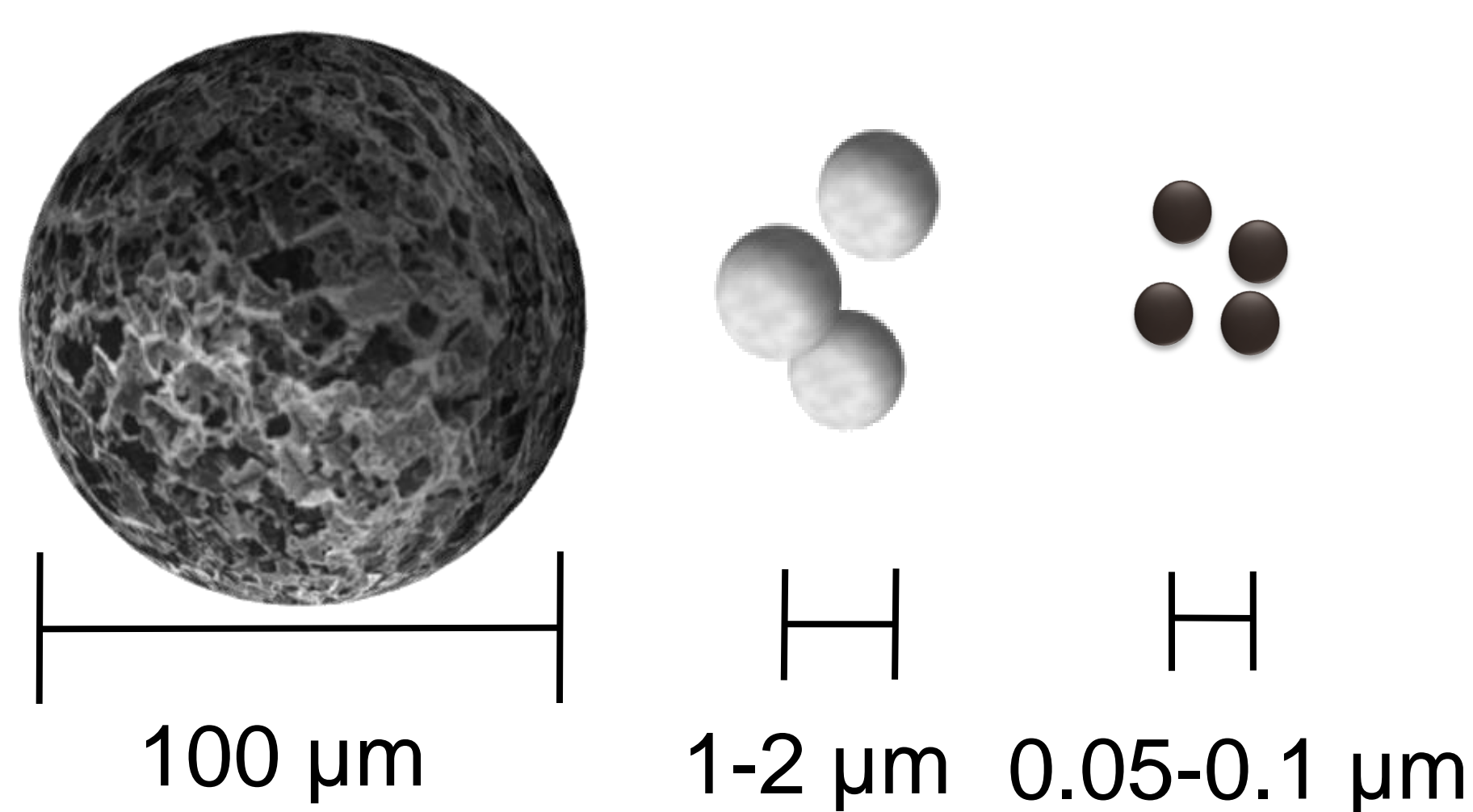


Strategies :

mass transfer phenomena

influence of particle size

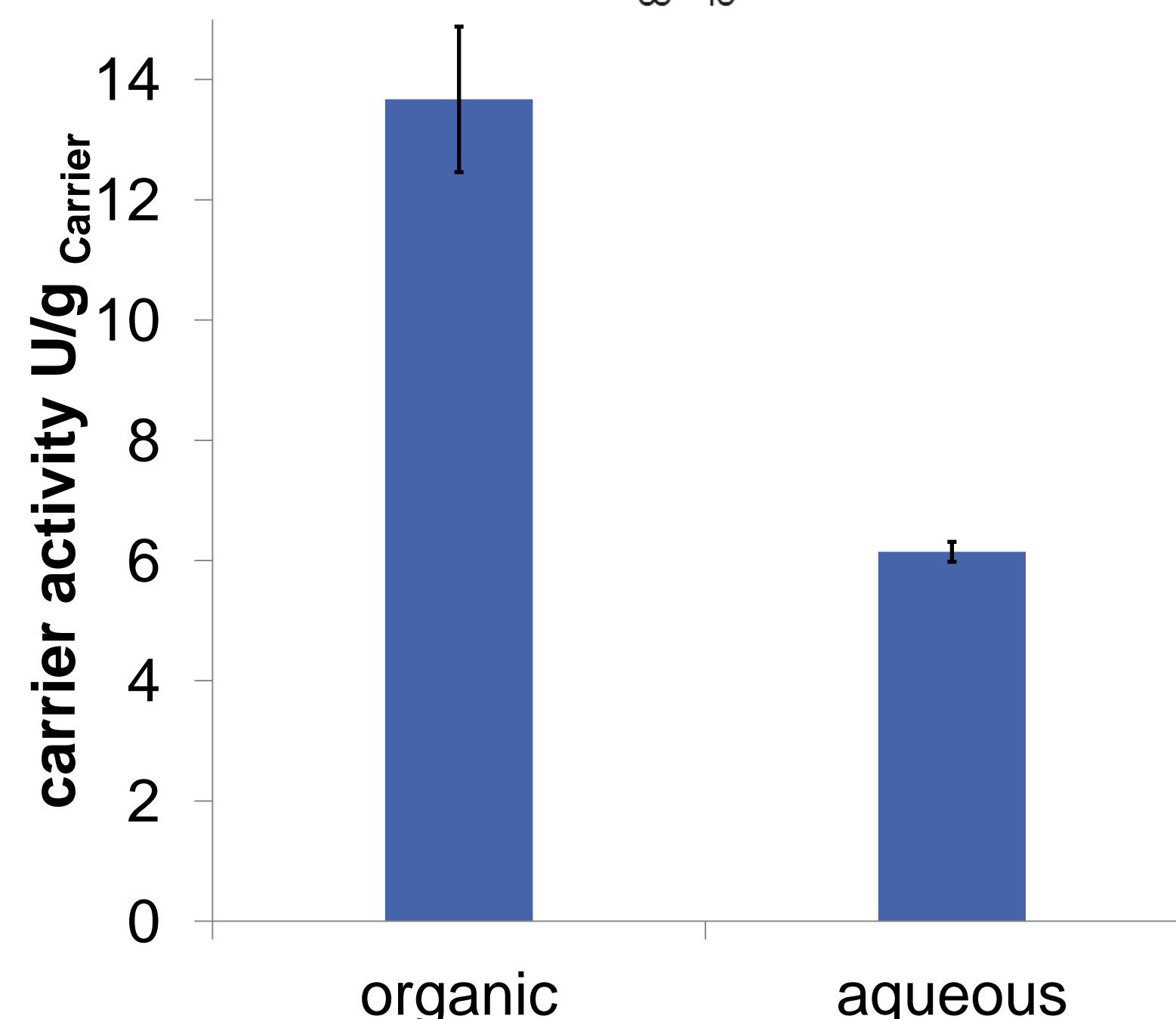
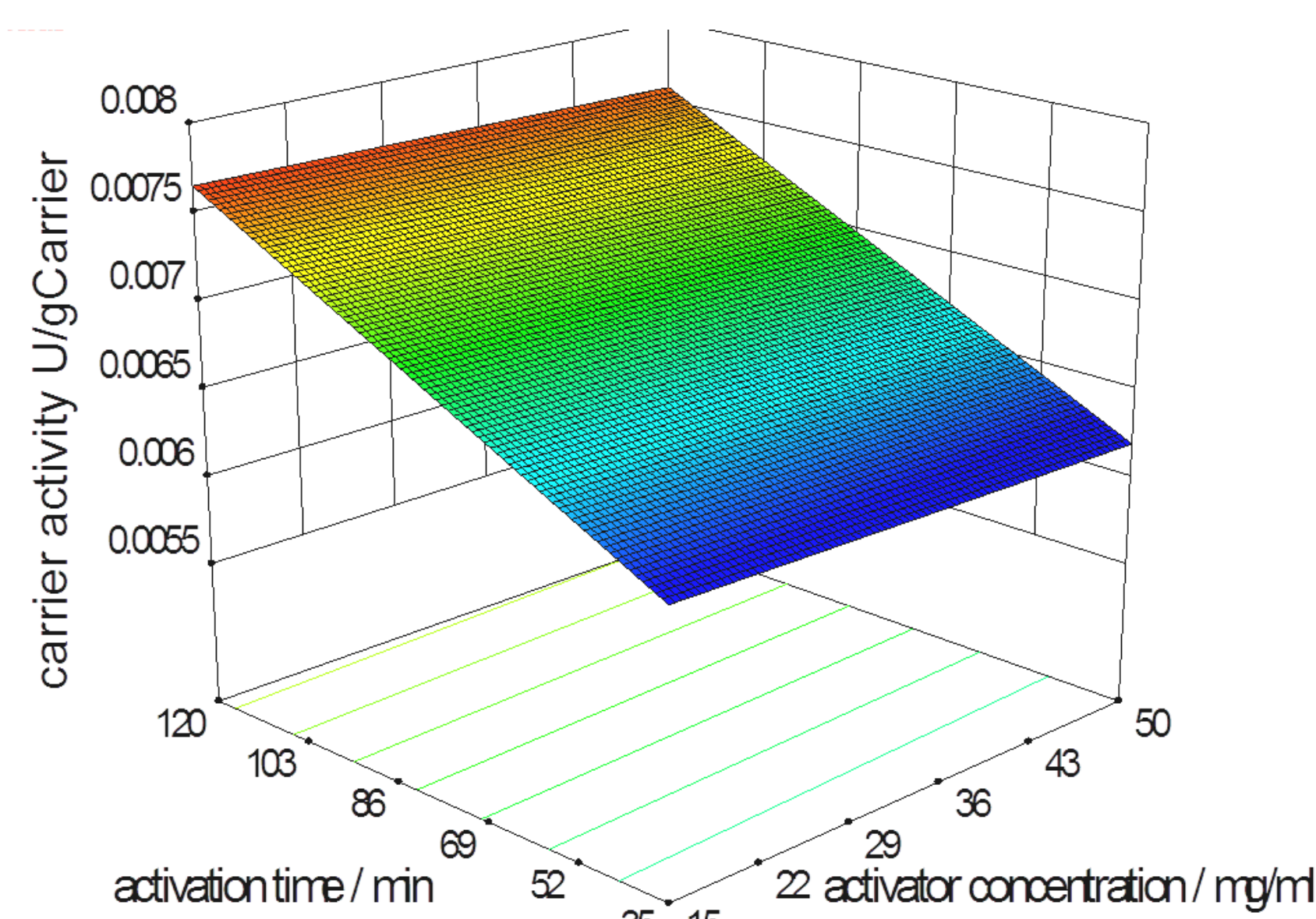
Comparison of different micro- and nano-magnetic particles



loss of active conformation

stabilization in organic media

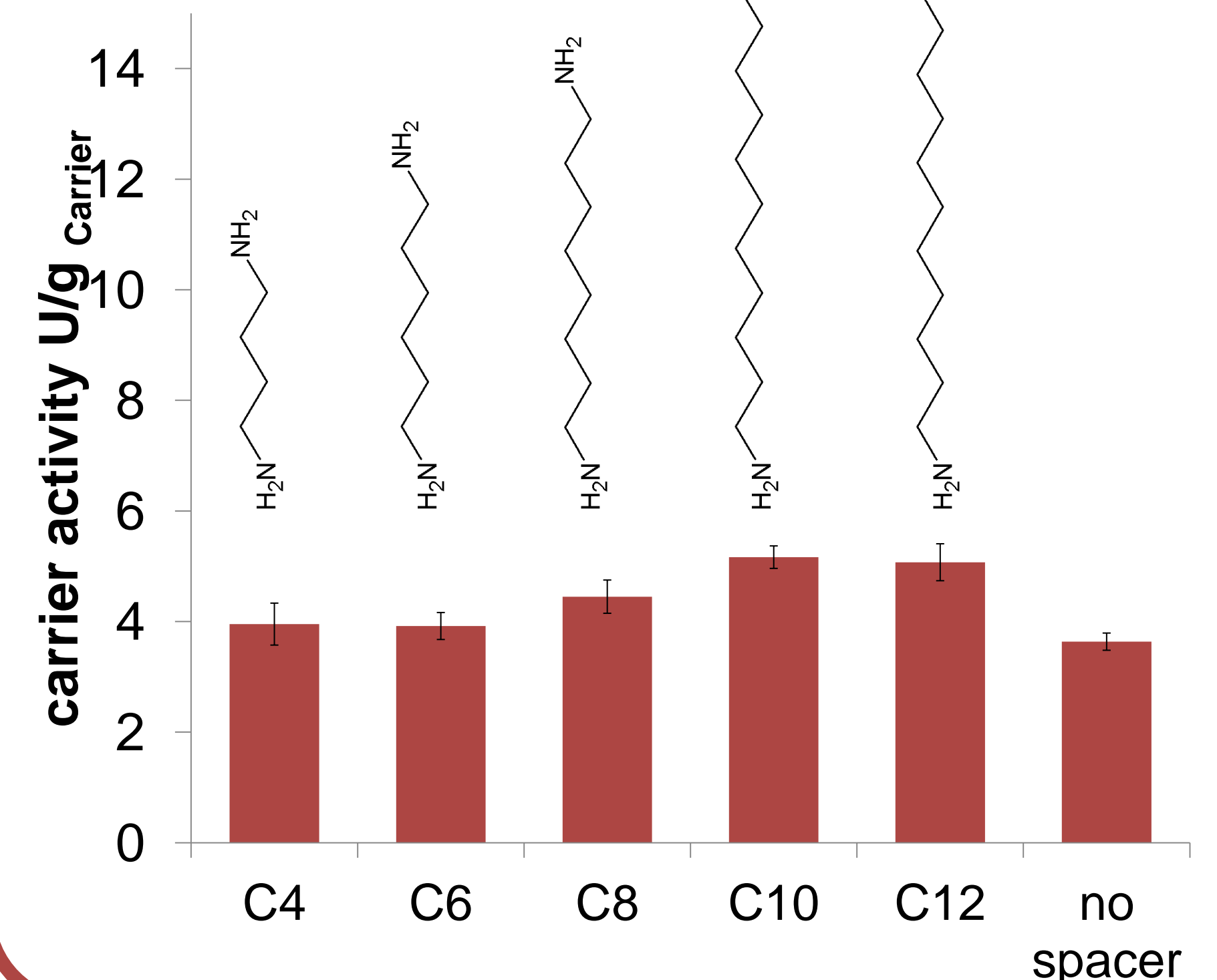
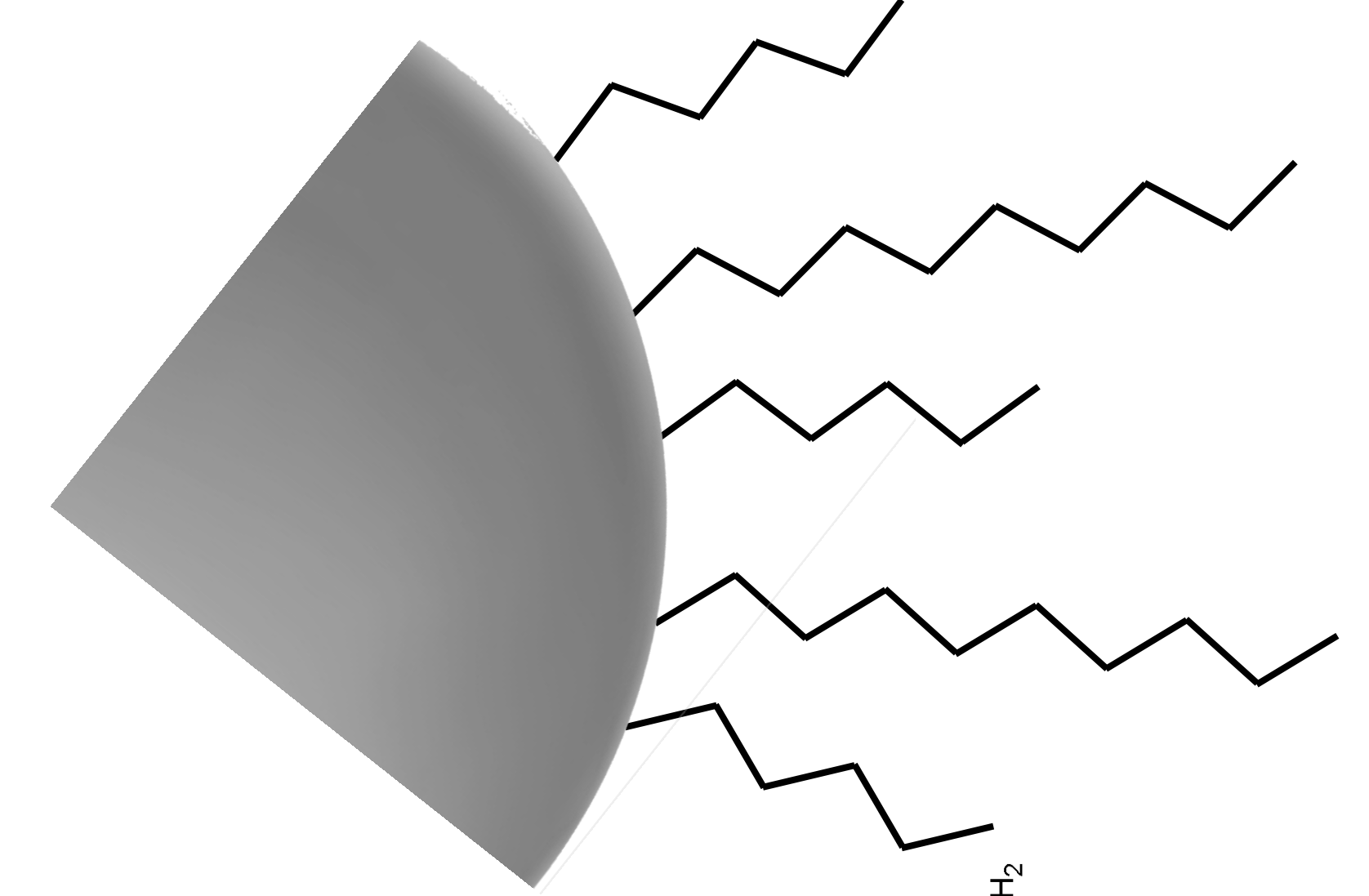
DoE-based development of immobilization method in organic micro-aqueous solution



steric hindrance

spacer introduction on particle surface

Testing of different spacer characteristics for carrier modification



Conclusions: Three different strategies were applied in order to improve the immobilization activity yield of trypsin. Reducing the particle size is the most promising approach. Further studies will focus on different spacer characteristics such as polarity and functional groups.