

EXPANDING THE INDUSTRIAL USE OF ROBUST OXIDATIVE BIOCATALYSTS FOR THE CONVERSION AND PRODUCTION OF ALCOHOLS

Introduction

Oxygen functionalities are key functional groups in many of today's chemicals and materials. The efficient introductions of oxygen-functionalities into raw materials are key chemical transformations in bulk and fine chemicals. Innovative bio-catalytic oxidation routes using molecular oxygen (from air) under benign and mild (pH) conditions such as ambient temperature and pressure can greatly improve the sustainability and economics of processes, but are so far mainly been applied in the pharma segments. In this segment, the enzyme-catalyzed step often represents the highest added value and the high price of the end-product (> €1000/kg) justifies less than optimal enzyme production and limitations in its catalytic efficiency.

Objectives

The ROBOX project aims at developing and demonstrating robust oxidative biocatalysts for the conversion of oxygen functionalities in the pharma, nutrition, fine/specialty chemicals and materials market.

In order to achieve the widening of industrial application of enzymatic bio-oxidation processes to also larger volume but lower price chemical markets, ROBOX will demonstrate the techno-economic viability of bio-transformations of four types of robust oxidative enzymes:

- P450 monooxygenases (P450s)
- Baeyer-Villiger MonoOxygenase (BVMOs)
- Alcohol DeHydrogenase (ADH)
- Alcohol OXidase (AOX)

ChemStream

With this project we hope to expand our portfolio of sustainable (and biodegradable) dispersing agents, emulsifiers and encapsulators. We would like to vary the "polarity" of the polyester chains over a wide area of the "Hansen solubility space". This could be achieved by the versatile chemistries offered within ROBOX by the use of Robust Oxidative

Biocatalysts for the conversion and production of alcohols. Special hydroxy-alkanoic-acids and lactones will be produced that can serve as monomers for the synthesis of versatile polymers which can be applied in inks & coatings.

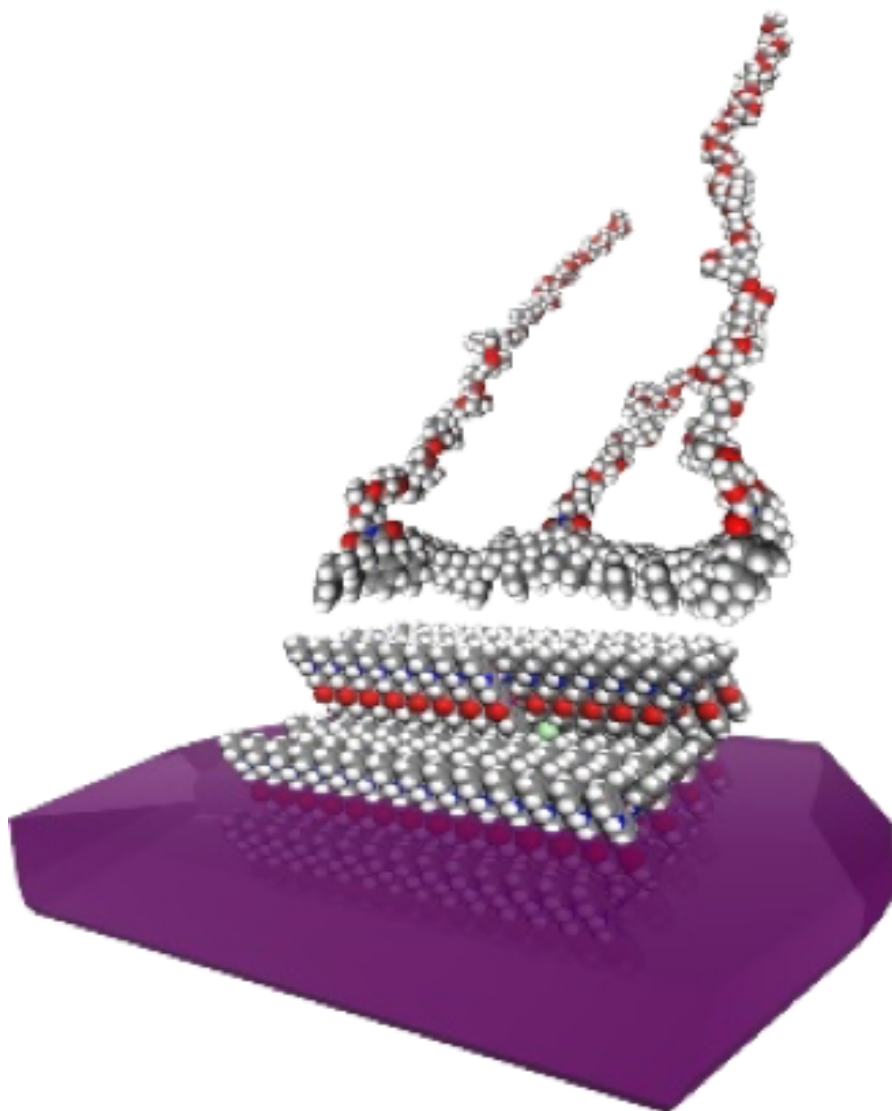


Figure 1: Example of a molecular model for pigment – dispersant interaction
Furthermore, the tailoring of the crystal morphology and surfaces of solid particles and thus influencing their physico-chemical properties is part of the ROBOX project.

Within the ROBOX project, ChemStream is positioned at the end of the value chain. In cooperation with technical partners we are responsible for upscaling our target reactions. By strategic validation together with potential customers we aim to create new business opportunities.



Figure 2: Characterization tailor made polymers by GPC and LCMS

Project website: <http://www.h2020robox.eu/partners/chemstream>

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