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# HIGH THROUGHPUT EXPERIMENTATION IN CHEMO-CATALYTIC VALORIZATION OF BIOMASS-BASED **POLYOLS TO 1,6-HEXANEDIOL**

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## Introduction

• Lignocellulosic materials alongside algae and animal fat as sustainable source for biofuels and platform chemicals.



- Research focusing on tailored valorization schemes of biomass
- Major challenges comprehend a selective depolymerisation, hydrodeoxygenation, and selective reduction or oxidation aiming for different platform chemicals (Figure 1).
- Herein, we present a selected example of HDO of poly-alcohols derived from biomass intermediates towards 1,6-hexanediol.

# Case of Study: From Biomass to "Green" Nylon

#### **Figure 1.** Selected value-chains based on Biomass



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oxatist synthesis

Screening Results

Analysis& Characterite

- Synthesis of ca. 500 catalysts
- Implementation of impregnation and co-precipitation techniques
- The transformation from powder to extrudates (shell coating via spray impregnation) (Figure 3)
- Optimization of the shell thickness and investigation shell thickness vs. catalytic activity





Figure 3. Shell coating using spray impregnation

- Catalyst screening and kinetic study using 26 plates (26 x 16 single reactors)
- Moving from powder to extrudates (Figure 3)
- A 8-fold unit with 100 mL catalyst capacity per reactor was used





- Full conversion of THF di methanol and THP methanol
- Main product HD and main intermediate 1,6-hexanetriol
  - Different catalytic system shows different activity and product distribution (Figure 5)



- Full characterization of the synthesized catalysts
- Shell thickness measurements using microscope (figure 6) or SEM



**Figure 4.** Scaling-Up: from powder to extrudates

Figure 6. Measurement of different shell thickness using microscopic technique at hte

- The reaction outcomes were analyzed using offline-GC
- GC Method optimization and compound identifications using GC-MS

# **Summary and Conclusions**

- High throughput catalyst and feedstock screening kinetics & mechanisms
- Process optimization and upscaling
- Method development & optimization analytics and reaction engineering

