

# EHL CATHOL

*Chemical transformation of enzymatic hydrolysis lignin (EHL)  
with catalytic solvolysis to fuel commodities under mild conditions*

<http://ehlcathol.eu/>

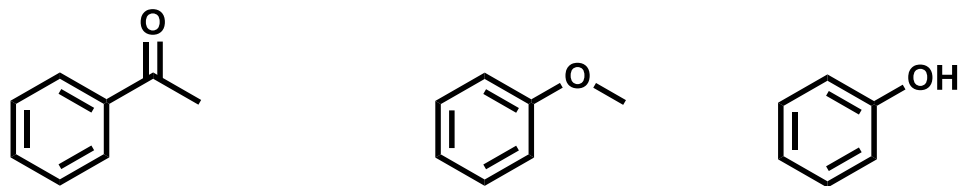
**W2: Mechanism-EHL solvolysis and potential condensation reactions**

## **Catalytic hydrogenation and hydrodeoxygenation of selected model compounds**



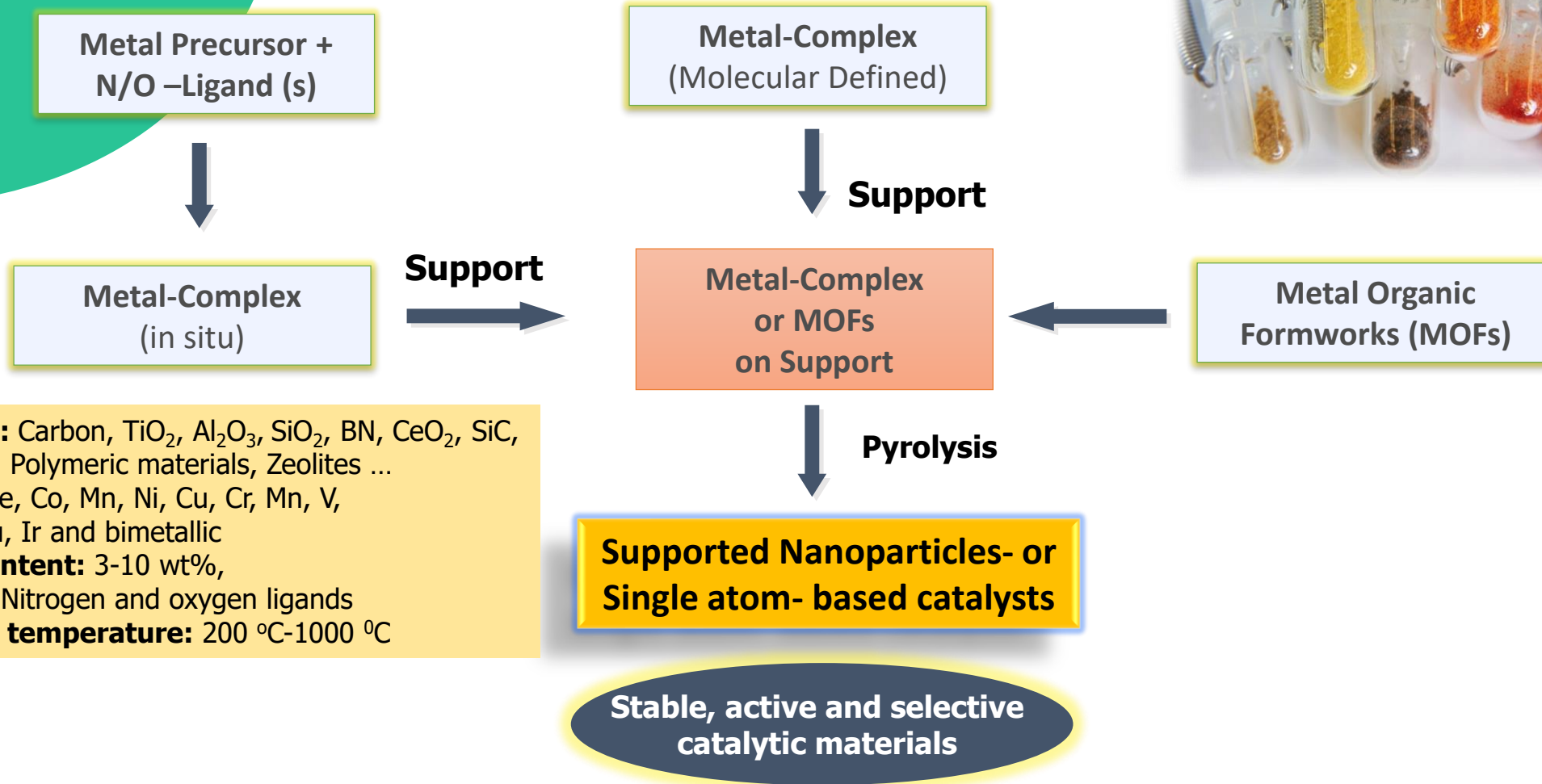
This project has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement no 101006744

# Catalytic hydrogenation/hydrodeoxygenation of model compounds

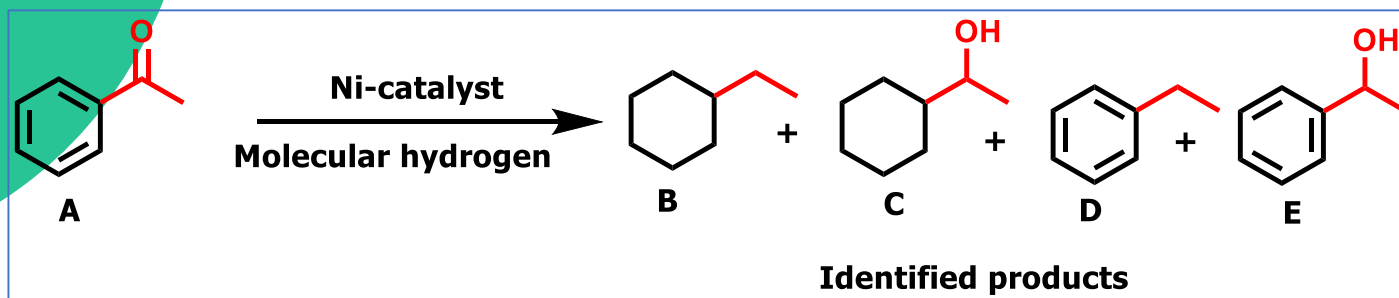


- **Development of heterogeneous base metal catalysts**
- **Reaction optimization for selective hydrogenation/hydrodeoxygenation processes**
- **Application of the established protocol for other EHL-derived model compounds**

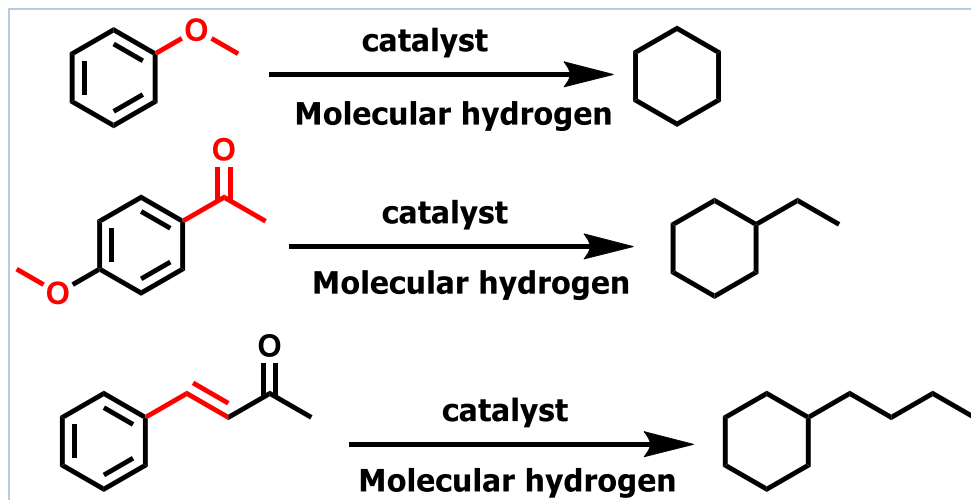
# Development of novel catalysts



# Catalytic hydrogenation/hydrodeoxygenation

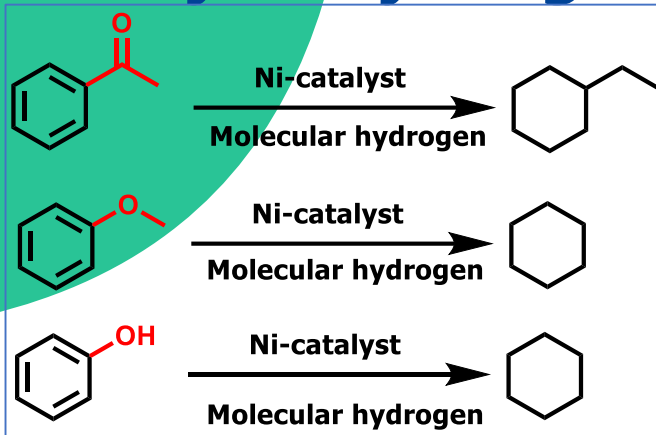


- B is the targeted product-Complete hydrogenation/hydrodeoxygenation
- Catalyst showed more selectivity towards product B (99%)

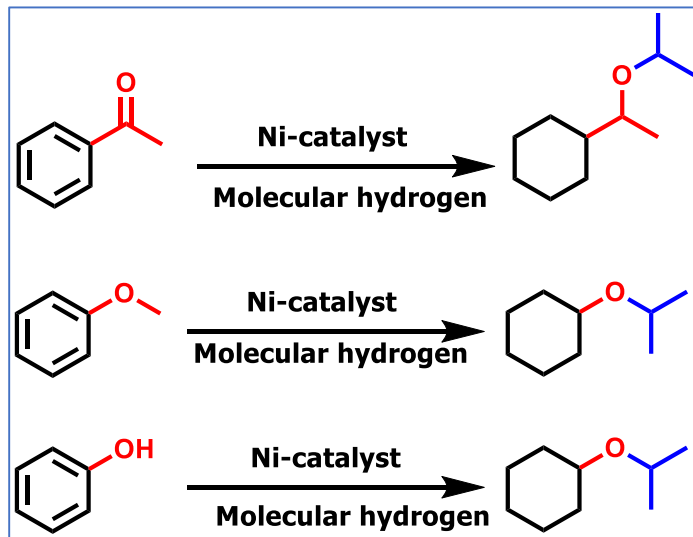


- In all the cases complete conversion and 99% selectivity were achieved

# Catalytic hydrogenation/hydrodeoxygenation

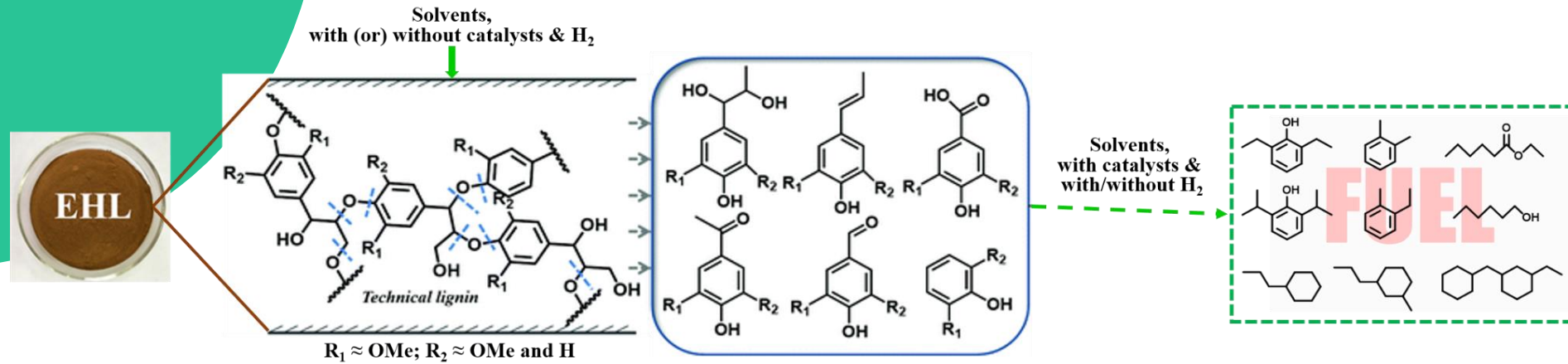


- Reaction in n-hexane or n-heptane or n-octane



- Reaction in i-PrOH
- i-PrOH is found to be the good capping agent

# Planned mechanistic investigations



- To study the initial kinetics and mechanism, we will select first EHL derived monomer and then dimer or oligomer (these will be provided by W4).
- Solvolysis, hydrogenolysis, hydrogenation reactions will be applied.
- *In situ*-IR or *in situ*-NMR studies will be conducted.
- Based on these studies, product distribution and suitable capping agents will be found out to protect/deactivate functional groups.
- We will look for the possible condensation or re-condensation reactions.

## Summary and outlook

- We developed Ni-catalyzed hydrodeoxygenation process for the conversion of ketones, ethers and phenols to (cyclo)alkanes.
- Hydrodeoxygenation of lignin and EHL-derived model compounds, dimers and oligomers will be tested.
- Mechanistic and kinetics investigations for the reaction of model EHL-derived model compounds will be made.