

Ligning refinery: towards bio-based replacements for aromatic building blocks

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Biorefinery aims at the sustainable preparation of chemicals from biomass and food waste. The success of this concept, which is still in its infancy, relies on the development of new and efficient materials for the catalytic upgrade of molecules derived from lignocellulosic biomass. Here, we report selected examples of our work on the synthesis of novel hybrid materials as catalysts for the upgrade of lignin into value-added chemicals. In our studies, we focused on the use of inexpensive and abundant metals (e.g. Ti, Ni) as well as biocompatible and sustainable precursors. In particular, we targeted a titanium nitride-nickel nanohybrid and evaluated its performance as heterogeneous catalyst for the hydrogenolysis of lignin model compounds, including di-aryl and alkyl-aryl ethers. The catalyst showed high efficiency and was therefore applied to the depolymerization of real lignin samples affording a variety of different aromatic and aliphatic platform chemicals.

In a second part of the talk, we will also discuss the possible application of lignin as building block for the preparation of new materials.

Selected references:

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