

Black Powder for Green Chemicals: Precious Metal Catalysts for the Conversion of Sustainable Feedstocks

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The negative impact of greenhouse gas emissions and global warming is widely recognized as a major and complex challenge for this decade and the decades to come. Although fossil feedstock was and is the predominant feedstock for the chemical industry, renewable feedstocks are alternatives to fossil resources. The aim is to reduce the carbon footprint and open up new routes to platform chemicals.

Forestry residues, such as lignin or 5-hydroxymethylfurfural (HMF) from cellulose, can serve as a renewable source of value-added chemicals. To date, lignin has been used primarily in paper manufacturing as an energy source, although it can also be used as a valuable feedstock for the chemical industry. Lignin is one of the most abundant polymers in nature and contains a variety of aromatic components.

In this presentation, we highlight strategies for obtaining organic building blocks and platform chemicals from renewable feedstocks by the effective deployment of precious metal-based catalysts. We describe in an use case, the development of a platinum-based catalyst for the efficient formation of phenolics from lignin for the use in phenolic resins. Both platinum loading and the selected support material influence the catalyst performance. The use of the optimized platinum-based catalyst ensures access to the organic building blocks while completely avoiding any coke formation.

Furthermore we will also discuss the cost attractiveness of precious metal-based catalysts, when applying recycling loop strategies, which allow an efficient use of the scarce precious metals.