

One of the major threats associated with the development of civilization is a depletion of fossil fuel reserves and increasing pollution of the environment. It can be minimized by the use of renewable feedstock both for the production of fuels and chemicals of high industrial importance.

The conducted research suggests that an application of lignocellulosic biomass to the production of chemicals (e.g. precursors of 'green' polymers, fuels etc.) can provide a very attractive alternative in comparison to the use of traditional resources. It is relatively cheap, does not compete with food production and can contribute to reduction of carbon dioxide emission.

It was demonstrated that the yield and selectivity of the biomass conversion process can be strongly improved by the use of heterogeneous catalysts. These catalysts usually consist of metallic phase introduced onto the support which allows to increase stability and dispersion of the metal on the surface.

Therefore, the main goal of the project is a development of efficient and sustainable method for the production of valuable chemicals having the 'green' origin. This can be achieved only by the development of catalytic materials that are active and selective in the reaction and thanks to their presence reaction products can be obtained. The properties of the catalyst which are crucial for the reaction are size of metal particles and acid basic properties of support.

In order to solve this research problem we tackle global approach.

Therefore, we decided to combine the strength of two scientific groups that have experience in controlled nanoparticle synthesis (Lodz University of Technology) and synthesis of mesoporous materials possessing equilibrated number of acid-basic sites (University of Chemistry and Technology Prague). Additionally, we will use novel methodology allowing to obtained nanoparticles possessing fully tailored made crystallite size and location on the support. This approach combined with detailed characterization of physicochemical properties with highly advanced technologies will allow us to understand which factors are crucial for synthesis of chemicals from biomass.

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