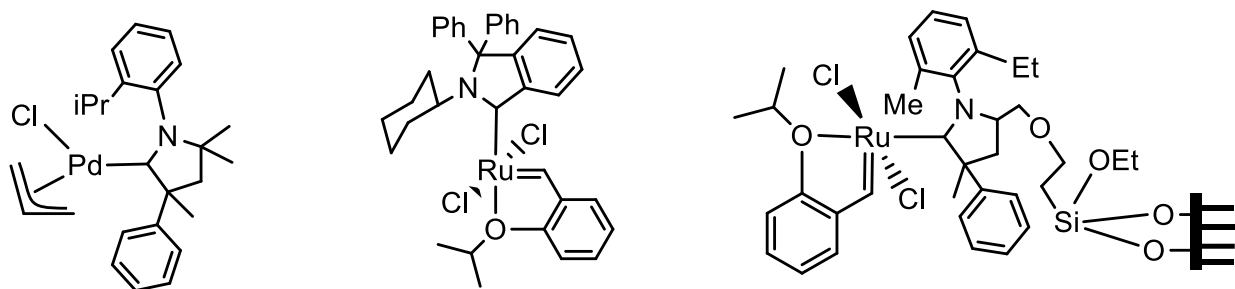


Description for the general public

The rapid development of civilization in the last few decades has brought growing demand for useful, dedicated to special tasks materials. One of the main methods of the synthesis of such materials are undoubtedly chemical reactions catalyzed by transition metals complexes. Moreover, the diversity of the available catalytic transformations and their crucial role in the modern industry are the reasons why searching for new, better and more efficient catalysts is nowadays one of the most important research direction in chemistry.

The design brief of this project is strongly connected with the challenges set up for the current metalorganic chemistry. The main aim of the project is to establish efficient synthesis protocols for new palladium and ruthenium complexes bearing cyclic monoaminocarbenes ligands and their application in the catalytic transformation essential for receiving special purpose materials. Due to that the project was divided into four parts. Firstly, the synthesis of spectrum of known and unknown monoaminocarbenes precursors with different aryl and alkyl substitution at C3 carbon atom is planned. Therefore, the obtained precursors will have diverse stereoelectronic properties as well as structures which allow us to establish the influence of ligand architecture on the catalytic activity of the received complexes. In the second part of the project the synthesis of wide various palladium and ruthenium complexes bearing the previously received cyclic carbene ligands will be carried out. Furthermore, the obtained catalyst will be isolated and characterized by different analytical methods like e.g. nuclear magnetic resonance spectroscopy and mass spectroscopy. In case of receiving suitable monocrystals structure of obtained chemical compounds will be determined. The next step of the project is to investigate the reactivity and catalytic activity of the previously synthesized ruthenium and palladium compounds in the wide range of catalytic reactions. Each investigated transformation will be optimized in order to select the most efficient system leading to desired products. Then, in the last part of the project immobilization on solid surface of palladium and ruthenium complexes through specially functionalized monoaminocarbenes ligand precursors will be accomplished. Moreover, the received catalyst will be tested in chosen catalytic reactions especially for their capability of reusability in the investigated systems.



Scheme 1. Examples of catalyst structures synthesized due to the project.

Last but not least, it is worth mentioning that the presented project corresponds with scientific research of the leading groups working on metalorganic synthesis and catalysis. Assumptive experiments aim to obtain new palladium and ruthenium catalysts and investigate their activity in the synthesis of special purpose materials. Therefore, the presented studies will improve the level of knowledge in dynamically growing field of metalorganic chemistry.