DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)
(no more than one page of typescript, both in Polish and English, language versions must be the same)

The olefin metathesis reaction, named by the Royal Academy of Sciences during the Nobel Prize ceremony in 2005 "the emerging green technology" is a widely used (but only in research, not in, e.g. pharmaceutical production) methodology for the synthesis of carbon-carbon double bonds. This reaction, although carried out under mild conditions, allows to obtain a wide spectrum of organic compounds of diverse structures that can be used, among others as medicines, flavour and fragrances or in the production of polymers. The olefin metathesis reaction is a catalytic reaction, which means that it requires the presence of small amounts of a specialized chemical (a catalyst) that will allow it to proceed. Currently, many complexes are used in metathesis, and the choice of the appropriate depends on the structure of the substrate, the solvent used, and the presence of impurities in the reaction mixture.

Unfortunately, the limitations of the available metathesis catalysts do not allow the most interesting but also the most difficult metathetical transformations to be carried out at the moment. Such reactions - very important from the industrial point of view—are, among others, cross-metathesis of waste α-olefins (useful in the production of cleaning products), processing of vegetable oils into biofuels, paints and personal care products (by ethenolysis) or production of macrocyclic compounds (eg. musks) at high concentrations. The lack of effective ethenolysis catalysts delays the construction of, for example, biorefineries that would convert cheap and waste vegetable oil into valuable chemical compounds.

In our project, we want to attack the most difficult cases in olefin metathesis, using ultra-modern catalysts based on ruthenium and iron, which we are just going to develop for this purpose during the Maestro project. The research will aim at finding catalysts resistant to unfavourable factors, such high reactions temperature (over 100 ° C), oxygen and moisture, or impurities present in the raw material obtained from vegetable oils or allow to do metathesis in biological systems.

We wish to use this project to acquire new knowledge about the properties of studied catalysts, which are advanced ruthenium compounds. As a result of these tests, we are going to find catalysts that will enable us to obtain the highest efficiency and purity of the desired products.

The key to a success, will be—we hope—novel and unique cationic nitrene ligands, or saying it simply novel and unique ligands that make our ruthenium catalysts better and maybe metathesis based on iron possible for the first time!