

CYCLO – Ag(II) promoted cycloaddition processes

DESCRIPTION FOR THE GENERAL PUBLIC

Hydrocarbons are simple organic compounds present in crude oil, which molecules are composed exclusively of carbon and hydrogen. One of most important challenges of modern chemical technology is the use and processing of light hydrocarbons in the industrial production of more complex organic compounds. Unsaturated hydrocarbons, having carbon-carbon multiple bonds, being susceptible to the process of addition, *i.e.* coupling with other organic molecules, are mostly used in today's chemical industry.

Due to the low reactivity of multiple bonds, the addition reactions of unsaturated hydrocarbons, proceed in multi-step processes involving the use of expensive catalysts. Otherwise, such reactions would run with high difficulties or would not run at all. Continuous research regarding novel and effective ways of multiple bonds activation s very important, because the possibility of running industrial syntheses with direct use of crude oil components would significantly reduce production costs. Numerous methods of multiple bonds activation are known, *i.a.* photochemical activation, chemical activation or electrochemical activation, however, there are some chemically inert systems which activation is not accessible using these methods.

CYCLO aims to attempt to design a novel protocol of cycloaddition process using an innovative activation agent containing divalent silver compounds, a very uncommon form of silver known to be one of the strongest chemical oxidants. It is planned to use uncommon divalent silver compounds: silver(II) sulfate(VI) and its hydrate, which have been recently designed, obtained in our laboratory.

Attempts of activation of unsaturated hydrocarbons will be carried out in classic systems. Determination of potential reaction scenarios and identification of the products potentially obtained will be carried out with use of standard analytical methods enabling separation of the products, determination of their chemical structure, as well as determination of the process' efficiency and selectivity, in case they occur.

Systematic tests of reactivity of silver(II) compounds against various types of unsaturated organic compounds. Understanding of the reactivity silver(II) compounds is important as a basic research task.

Design of a new protocol of cycloadditions reactions would constitute a significant novelty, allowing future development of innovative synthesis technologies which could be used in industrial production of various chemicals of high market importance. Potentially, new complex products currently unavailable with use of other known methods will be obtained.