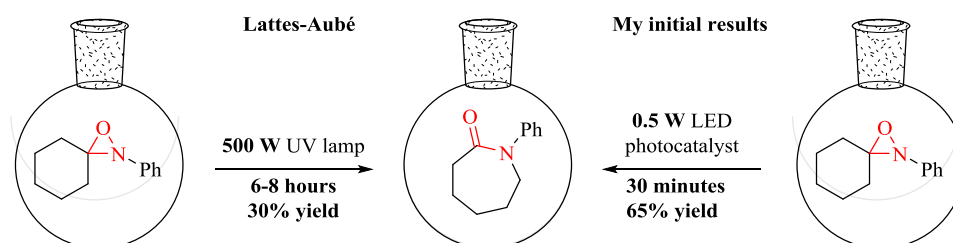


OLD REACTION IN A NEW LIGHT – DEVELOPING A NOVEL METHOD OF OXAZIRIDINES REARRANGEMENT TO *N*-SUBSTITUTED AMIDES USING VISIBLE LIGHT PHOTOCATALYSIS

One of the main goals of modern organic chemistry is to develop new tools for synthesis of molecules which exhibit desirable, well-defined properties. Hundreds of new organic compounds are synthesized every year to serve us as pharmaceuticals, building blocks for polymer industry, electronic sciences or even in household chemistry. Without any doubt we may say that products of organic synthesis are irreplaceable in almost all areas of our everyday life. Nowadays people are more aware of consequences of rapid chemical industry growth. We recognize and understand the need of responsible use of limited (non-renewable) resources. However we also know, that technological progress is essential for proper functioning of increasingly populated world. To meet the challenges of sustainable development we are forced to look for new, better methodologies or modify existing processes to achieve inexpensive and energy-efficient, straightforward methods that will allow us to obtain high quality, pure products with satisfactory yields and minimal waste. Therefore, along with the development of new synthetic methods, chemists look for alternative reactions that offer the same product but require milder, cost-effective and environmentally friendly protocols. Some methods have great synthetic potential, but remain abandoned or are rarely used (“laboratory-only methods”) due to the difficulties in carrying out the reaction or problematic product isolation from reaction mixture.

In this project I would like to investigate Lattes-Aubé reaction, which is a representative example of aforementioned issues. It is a photochemical method of converting compounds called oxaziridines to corresponding amides. Amides are essential compounds for life. Without amide bond there would be no proteins – the basic building blocks of every living organism. Amide bond is also incorporated in the structure of broad variety of synthetic molecules that are biologically active (e.g. medications) or exhibit special mechanical properties (polyamides – widely used class of polymers). These two reasons justify the need of exploration the amide bond forming reactions. Unfortunately Lattes-Aubé reaction creates the amide bond in course of prolonged UV-irradiation of the appropriate oxaziridine. Taking into account that oxaziridines synthesis from inexpensive and readily available

ketones or aldehydes is relatively simple, two-step process, the only weak point of this methodology is the direct photo-



lysis which involves highly-energetic, energy-inefficient light source which – in addition – is harmful for staff. Moreover the UV-lamps contain mercury vapors, what increases the risk of the carried out reactions and cause environmental problems connected with waste disposal. Bypassing these obstacles may result in the development of highly efficient amide bond forming method. This is the point where my investigations begin. According to my preliminary results, the oxaziridines may undergo rearrangement to yield corresponding amides, when special kind of light-driven catalyst – the photocatalyst – is applied. During the project I would like to implement the photocatalytic approach to oxaziridines rearrangement reactions, which – hopefully – will result in the delivery of the novel, better synthetic method of amides preparation.