

## Project 2.16. Sustainable photochemical transformations of diazo reagents as a source of reactive intermediates

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**Unit:** group XV

**WWW:** [https://ww2.icho.edu.pl/gryko\\_group/index.html](https://ww2.icho.edu.pl/gryko_group/index.html)

### Background:

Drawing inspiration from photosynthesis, scientists challenged the use of visible light for the activation of organic molecules and the discovery unknown solar-driven transformations. Plethora of organic compounds have been investigated in terms of their photochemical activity. However, **the fact that diazo compounds possess their intrinsic chromophore (-C=N<sup>+</sup>=N<sup>-</sup>) puts them in a unique position among many reagents that can absorb visible light and hence are suitable for solar-driven transformations.** To date, they are extensively studied in metal catalyzed reactions and proved to undergo a range of unusual transformations, furnishing even complex molecules with impressive stereoselectivities. As traces of toxic metals are unacceptable by pharmaceutical industry, greener methodologies are in high demand.

### Aim:

**The main objective of this proposal is to unveil general reactivity modes of diazo compounds under visible light-irradiation. We will develop their solar-driven reactions and determine reactive intermediates (singlet or triplet carbenes, radicals, others) generated during these processes.** To this end, we will elaborate direct photolysis of diazo compounds which absorb in the blue region in C-H insertions. For compounds unreactive under visible light-irradiation, photocatalyzed transformations in the presence of a photosensitizer or a photoredox catalyst represent an alternative.

In particular, the main tasks will involve:

- design, preparation of diazo compounds absorbing visible light and determination of their optical properties;
- studying reactions of diazo compounds in the presence of photoredox catalysts;
- scope and limitation studies;
- analytical characterization of synthesized;
- preparation of manuscripts.

### Requirements:

- master degree in chemistry;
- experience in organic or related;
- other skills include analysis and interpretation of experimental data (NMR, MS, UV/Vis);
- demonstrated experience in research work will be an asset;
- effective written and oral communication skills in English.