

Aim. The aim of this project is to investigate the potential of anionic forms of flavin derivatives as photocatalyst. This research will contribute to the development of organic anion-based visible light photoredox catalysis, which is a novel and promising approach with practical applications.

Abstract. The use of excited organic anions as photoredox catalysts offers several advantages as compared to commonly used neutral molecules, particularly in reductive chemistry. However, this approach is still in its early stages and requires tailored catalysts. Flavin derivatives, with their well-defined redox states and various possibilities, provide an ideal platform for further development of “anion-based *visible-light* photoredox catalysis”. This project aims to explore the photophysical and chemical properties of anionic forms of flavin derivatives using experimental and theoretical methods. Based on the results, new photocatalytic systems using excited flavin anions will be designed with a focus on photoreductions beyond the current scope of photoredox catalysis. Additionally, a general design principle for flavin-type anions in photoredox catalysis will be established. These objectives will be achieved through international cooperation between a group skilled in flavin synthesis and photocatalysis and a group focused on photophysics and quantum chemical calculations.