

Subject proposal for Erasmus students in Chemistry

Asymmetric catalysis for the production of chiral intermediates

The access to chiral compounds with excellent optical purity is of high interest for organic chemists in general and for pharmaceutical chemistry in particular. Thus, the discover of new efficient processess able to induce very high seletivities during specific organic transformations is of high potential value. Among the various methodologies which can be used for that purpose, enantioselective catalysis is a particularly pertinent approach. Catalytic processes can be assisted by either organometallic complexes or by pure organic catalysts. In our laboratory, we have an expertise in the application of enantioselective catalysis for the preparation of specific targets. We also have a ongoing interest in the preparation of chiral auxiliaries and in their testing in asymmetric catalysis.

This project is related to the synthesis of chiral phosphorous based ligands, the preparation of the corresponding organometallic complexes and their evaluation in enantioselective catalysis. The applicant will preferentially use natural amino acids as building block for the synthesis of the chiral auxiliaries. The enantioselective reactions we are working on are, for instance, asymmetric hydrogenation of olefins, ketones and imines on the one side and the formation of chiral quaternary centers via asymmetric allylic alkylation and silylcyantion on the other side. All these reactions can be used to prepare organic intermediates of interest selected among pharmaceutical targets. The applicant will explore one of these catalytic reaction.

Key words: Asymmetric catalysis; organometallic compounds, phosphorous ligands, hydrogenation, C-C bond formation, organocatalysis, organic synthesis

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