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in kemijsko tehnologijo

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VABILO NA PREDAVANJE V OKVIRU DOKTORSKEGA ŠTUDIJA KEMIJSKE ZNANOSTI

Prof. Tibor Soós

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z naslovom:

Bifunctional Organocatalysis: Simple Concept for Complex Process

v sredo, 28. februarja 2018 ob 15:00 uri
v predavalnici 1 v 1. nadstropju Fakultete
za kemijo in kemijsko tehnologijo, Večna pot 113

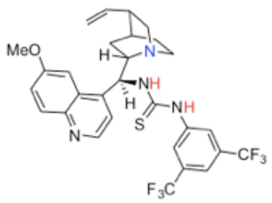
Vljudno vabljeni!

Povzetek:

Our research program revolves around the theme of bifunctional catalysis, thus the major objectives of our group are catalysts design and discovery, methodological developments and mechanistic investigations. Although we are exploring fundamental scientific questions and applying the resulting knowledge in methodological developments, our overarching goal is to provide practical and widely applicable catalysts and reactions that foster the progress in academic labs and are amenable for industrial applications.

Along this line, two key topics will be presented, the bifunctional non-covalent organocatalysis and the frustrated Lewis pair chemistry.

We have developed epi-quini(di)ne bifunctional thiourea organocatalysts **1** as a general and efficient catalysts for a variety of asymmetric reactions.[1] Our systematic work revealed many aspects of bifunctionality and showed also the synthetic potential of this chemistry in API synthesis. Most recently, we have initiated a synthetic program which exploits the potential offered by bifunctional organocatalysis to construct highly complex structures. We have developed a new and versatile building block for terpenoid synthesis and demonstrated its potential natural product synthesis.



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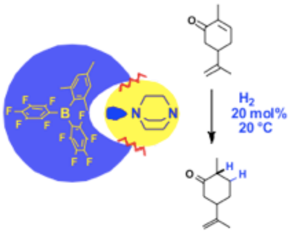

2

Despite their efficiency, however, there is an inherent limitation for bifunctional catalysts: the large potential for catalyst self-quenching which automatically reduce the overall efficiency (e.g. TOF). This drawback can be circumvented in certain cases with conscious tuning of the catalysts Lewis acidic or/and basic sites. Accordingly, even the activation of molecular hydrogen can be realized using a unique bifunctional system, the frustrated Lewis pair (FLP). In these systems, the steric hindrance is used as a key design element, so finally there is an incapability of adduct formation between Lewis acid–base pairs due to the large steric congestion. While the first generation of FLPs could be employed in metal-free hydrogenation, there were multiple synthetic limitations that inhibited the penetration of this valuable metal-free catalytic hydrogenation protocol. Most importantly, several non-orthogonal reactivity of the FLP with polar functionality markedly narrowed the scope of this methodology. To avoid this limitation, we have introduced the size-exclusion structural design element in FLP chemistry and developed a unique frustrated Lewis acid-base pair catalyst **2** having an unprecedented functional group tolerance, orthogonal reactivity and even water tolerance.[2]

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