



REGIO-, STEREO- AND ENANTIOSELECTIVE CH-ACID REACTIONS CATALYZED BY RECOVERABLE ORGANIC CATALYSTS BEARING IONIC LIQUID MOIETIES

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Organocatalysis is one of the most intensively developing areas of modern organic chemistry. In particular, organic compounds are widely used as acid-base [1] and phase-transfer [2] catalysts of chemical reactions. CH-Acid reactions catalyzed by some chiral amines or amino acids have enantioselectivities comparable or even higher than in corresponding organometal-catalyzed reactions [1, 3].

Yet, the recovery and reuse of organocatalysts which are generally lost during the working-up procedure remain challenging and unsolved problems so far. Herein we propose a simple and efficient approach to the regeneration of organic catalysts by the incorporation of specific ionic liquid moieties, in particular organic cations or fluorinated anions, to their structure. The ionic groups are held within the catalyst by dipole-dipole interaction forces or covalent bonds. They reduce catalyst's solubility in organic and sometimes in aqueous media thereby facilitating its separation from reagents and products. Furthermore, varying the cation or anion structure allows tuning the catalyst activity and selectivity.

The designed ionic systems have been applied as phase-transfer or acid-base catalysts in chemo-, stereo- and enantioselective Michael, Knoevenagel, aldol, croton, cyclopropanation, and multi-component CH-acid reactions. High product yields, *de* and *ee* values were attained under the action of multiply used catalysts. A series of biologically active compounds such as acyclic isoprenoid analogs with wound-healing and anti-cancer activities were synthesized by the proposed methods.

References

1. S. Mukherjee, J. W. Yang, S. Hoffman, and B. List, *Chem. Rev.*, **2007**, *107*, 5471.
2. Y. Sasson, G. Rothenberg, in *Handbook of Green Chemistry and Technology* (Eds.: J. Clark, D. Macquarrie), Blackwell Science Ltd., Oxford, **2002**, p. 206-267.
3. *Enantioselective Organocatalysis* (Ed. P. I. Dalko), WILEY-VCH Verlag GmbH & KGaA, **2005**, p. 1-536.