

ORGANOCATALYSIS

This research area involves the development of new organocatalytic processes for the synthesis of biologically relevant molecules. Organocatalysts are low-molecular-weight compounds whose catalytic activity resides in the molecule itself and not in the presence of metals. Organocatalysts are usually readily available, robust, inexpensive, and non-toxic. These major features provide operationally simple routes to useful compounds such as biologically active molecules without generating any wasteful by-products. From a mechanistic point of view, common ability of many organocatalysts is to mimic the catalytic activity and selectivity of metal-free enzymes. It can be envisaged that hydrogen bonding, electrostatic, and steric interactions stabilize the transition states of organocatalyzed reactions in a similar but simplified fashion if compared to enzyme catalysis, leading, however, to comparable levels of stereoselectivity.

GOALS

- Study of the parallelism organo/bio catalysis in the stereoselective formation of carbon-carbon bonds.
- New processes promoted by *N*-heterocyclic carbenes.
- Development of supported organocatalysts.
- Mechanistic investigations.

INSTRUMENTS AND METHODS

Mass (MS) spectrometry and infrared (FT-IR) spectroscopy. Nuclear magnetic resonance (NMR). Elemental analysis. Chromatographic instruments.

MAIN SUBJECTS

Organic chemistry, biochemistry

RESEARCH GROUP

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