

## Preface

After the pioneering work of Louis Pasteur and Emil Fischer in the middle and at the end of the nineteenth century, respectively, it still took more than fifty years before chemists started to discuss transition state models together with polar and steric effects to gain more insight into the phenomenon of asymmetric induction. Even first observations in organic synthesis of enantioselectivities comparable to those of enzymes in the late fifties and sixties of the 20<sup>th</sup> century did not convince the chemical community and the term “asymmetric synthesis” was regarded a mechanistic curiosity rather than a practical way to synthesize compounds of high enantiomeric purity.

In the mid-seventies, with the development of generally applicable stoichiometric asymmetric syntheses, especially the Meyers oxazoline methodology as the first one, the scientific community began to believe that asymmetric synthesis really worked resulting in an explosive growth of this new field. Later on, and mainly driven by the fact that the biological activity of enantiomers is usually different, dozens of new chemical companies were founded all over the world in a newly created area called “chirotechnolgy”.

Around that time and after intensive discussions several professors of the RWTH Aachen University and the nearby Jülich Research Center decided to apply at the German Research Council for a so-called Collaborative Research Center on the topic of asymmetric synthesis. Looking back, it was truly a seminal event when the Professors D. Enders, W. Keim, M.-R. Kula, H. Sahm and C. Wandrey stopped their cars at the highway station Köln-Frechen and nailed down the proposed research topic as “Asymmetric Synthesis with Chemical and Biological Methods”. After Professor E. Winterfeldt, as an advisor, saw this new initiative “under a good star”, indeed the new “Sonderforschungsbereich 380” was funded and started in 1994.

From the very beginning of this long term research endeavor, the aim has been to cover *all* aspects of the *entire* field of asymmetric synthesis including stoichiometric and catalytic asymmetric syntheses with chemical and biological methods as well as the development of new reaction technologies. The interdisciplinary cooperation among the areas of classical organic and inorganic chemistry as well as technical chemistry (RWTH Aachen University) and the various fields of

enzyme technology and biotechnology (Research Center Jülich, HHU Düsseldorf) resulted in efficient asymmetric syntheses of synthetic building blocks, fine chemicals, natural products and biologically active compounds in general. Mechanistic and theoretical aspects, organic synthesis, organometallic chemistry, homogeneous and heterogeneous transition metal catalysis, microbiology, enzyme- and biotechnology were all employed and used for stereoselective C-H-, C-C-, and C-heteroatom bond formations.

Besides the scientific success of this Collaborative Research Center as measured in publications, patents and foundation of start-up companies, it should be mentioned that a high percentage of the younger scientific members received and accepted calls for full professorships including D. Vogt (Eindhoven), W.-D. Fessner (Darmstadt), U. Kragl (Rostock), A. Liese (Hamburg), S. Bräse (Karlsruhe), G. Sprenger (Stuttgart) and M. Müller (Freiburg) and also associate professorships as C. Ganter (Düsseldorf), L. Elling (Aachen), M. Ansorge-Schumacher (Berlin) and M. Pohl (Privatdozent, Düsseldorf). A highlight during the twelve years of funding was the “Deutsche Zukunftspreis” awarded by the Federal President of Germany to Prof. Kula and Dr. Pohl and presented in a spectacular nationwide television show broadcasted from Berlin in 2002. Professor Maria-Regina Kula, herself being a chemist, was always aware of the necessity to combine biological and chemical catalytic methods. As her 70<sup>th</sup> birthday coincides with the appearance of this book, the editors would like to express their warm congratulations and best wishes for her future.

We thank the German Research Council (“Deutsche Forschungsgemeinschaft”) for the generous financial support of the Collaborative Research Center “Sonderforschungsbereich, SFB 380” over a period of twelve years. In particular, we are thankful to Dr. H. H. Lindner and Dr. A. Pollex-Krüger as well as Dr. W. Rohe, Dr. P. Schmitz-Möller and Dr. H. Schruff for their organizational help during the course of the priority programme. In addition, on behalf of all participants of the Collaborative Research Center, we would like to thank the scientific referees, the Professors M. Ballauff (Bayreuth), J. E. Bäckvall (Stockholm), A. Böck (München), H. Brunner (Regensburg), H. Buchholz (Erlangen-Nürnberg), W. Buckel (Marburg), G. Dziuk (Freiburg), F. Effenberger (Stuttgart), H. Eschrig (Dresden), H. Fischer (Konstanz), W. Francke (Hamburg), G. Gottschalk (Göttingen), H. Griengl (Graz), G. Helmchen (Heidelberg), U. Kazmaier (Saarbrücken), H. Kessler (München), H. Kunz (Mainz), E. P. Kündig (Genf), J. Mulzer (Wien), H.-U. Reißig (Berlin), K. Sandhoff (Bonn), G. Schulz-Eckloff (Bremen), H. Simon (München), W. Spiess (Mainz), J. Thiem (Hamburg), H. Tschesche (Bielefeld), H. Vahrenkamp (Freiburg), and H. Waldmann (Dortmund) for their help, advice and the many fruitful discussions.

We hope that this book will be useful and a source of inspiration for all those interested in the chemical, biological and technical aspects of asymmetric synthesis in general and will stimulate new ideas and research activities among the young scientists in this rapidly growing field.