

*Special Issue Reprint*

## **New Trends in Asymmetric Catalysis**

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The synthesis of enantiopure organic compounds is a key issue for several applications in pharmacology, food chemistry, agricultural chemistry, perfumery, materials science and other industrial sectors. Nowadays, asymmetric catalysis is undoubtedly the most important tool to achieve this goal. This technology, in fact, enables the production of large amounts of enantiomerically enriched compounds, employing relatively small quantities of chiral enantiopure catalysts, which is exactly what is accomplished by enzymes in nature. Since the pioneering works of Noyori, Knowles and Sharpless, which later earned them the Nobel Prize in Chemistry, asymmetric catalysis has experienced a rapid and relentless development in the last fifty years. The tremendous expansion of enantioselective transformations, the design of novel and more efficient organometallic and organic catalysts, the development of sophisticated bioreactors and cell factories, are just some of the elements responsible for such growth. However, new challenges of asymmetric catalysis are devoted to enhancing the process's sustainability, by the introduction of recyclable and low-cost catalysts, and the use of renewable starting materials and energy source. This book provides an overview of some of these development directions and comprises a collection of review papers and a research article authored by renowned researchers actively involved in this field. The topics covered by the review papers are photoredox-catalyzed reactions of imines, asymmetric catalytic electro-synthesis, cooperative catalysis of chiral N-heterocyclic carbenes and Lewis acid, and asymmetric ring-opening reactions of epoxides catalyzed by metal-salen complexes. The research article presents a proline-catalyzed aldol reaction in water-methanol solvent mixture.

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