

Preface

It is difficult to imagine chemistry without N-containing compounds, which occupy the significant position of living matter, pharmaceuticals, dyes, and materials. Therefore, the construction of C–N bond for the preparation of N-containing compounds has always been the important topic in organic synthesis. In the past century, substitution reactions (both nucleophilic and electrophilic amination), cross-coupling (including the named Ullmann reaction, Buchwald–Hartwig cross-coupling, and Chan–Evans–Lam coupling), nitrene insertion, cycloaddition, click chemistry, condensation and rearrangement reactions have been elegantly developed and widely applied for the C–N bond construction and therefore incorporate N-partners into substrates. Among them, the direct C–N bond formation through C–H/C–C bond functionalization is of great importance because it enables the direct conversion from simple hydrocarbons to N-containing compounds. Numerous elegant reviews in this area have been recently published on C–H amination and amidation. In recent years, the emerging methodologies on the direct incorporation of only N, NH, or NH₂ atoms into substrates for the construction N-containing compounds attract considerable attention, in which most cases could not be classified according to the traditional amination, amidation, cyanation, or nitration. These methods providing efficient protocols for the transformation of simple hydrocarbons to N-containing compounds, with deep understanding of their mechanism might promote the design and development of new transformations. However, there are few reviews summarizing the recent development of nitrogenation strategy by incorporating only nitrogen atoms into molecules. We therefore planned to publish a mini book that will focus on the direct incorporation of only N, NH, or NH₂ atoms into substrates through C–H and/or C–C bond cleavage, which avoids the pre-activation of substrates including the simple hydrocarbons and therefore makes the methods more atom economy and step economy. The book consists of seven chapters describing interesting achievements for the preparation of amines, amides, nitriles, carbamides, azides, and N-heterocyclic compounds. The mechanisms of these novel transformations are also illustrated in this book. We hope this book will serve as an accessible introduction to nitrogenation strategy for

chemists interested in N-compound synthesis and those interested in discovering new reagents and new reactions.

I will always feel grateful to those who have contributed and made this book possible. The book has been contributed by my group members, three of whom are now professors at Xiangtan University (Professor Wang Zhou), China Pharmaceutical University (Professor Bo Zhang), and Ningxia University (Professor Qing-Zhong Zheng). Dr. June Tang, Dr. Antony Raj J., and Dr. Kavitha Palanisamy from Springer are appreciated for their kind assistance and great patience.

Although there are a large number of papers on the selected subject, we can only incorporate the recent references. We nevertheless extend our apologies to all the scientists whose research findings could not be cited or discussed in our mini book. The present book will be of interest to all organic chemists as well as pharmaceutical and material chemists.

Our work that appears in this book is supported by the National Basic Research Program of China (973 Program, 2015CB856600), the National Natural Science Foundation of China (21325206, 21632001), and the National Young Top-notch Talent Support Program.

Beijing, China
August 2016

Ning Jiao

<http://www.springer.com/978-981-10-2811-3>

Nitrogenation Strategy for the Synthesis of
N-containing Compounds

Jiao, N. (Ed.)

2017, VII, 218 p. 214 illus., 54 illus. in color., Hardcover

ISBN: 978-981-10-2811-3