

## 11

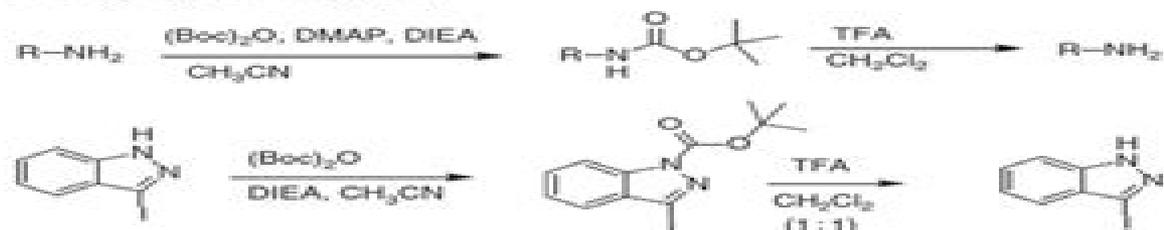
## Protection and Deprotection of Common Functional Groups

Each reaction first step is the protection and second step is the deprotection as shown below:

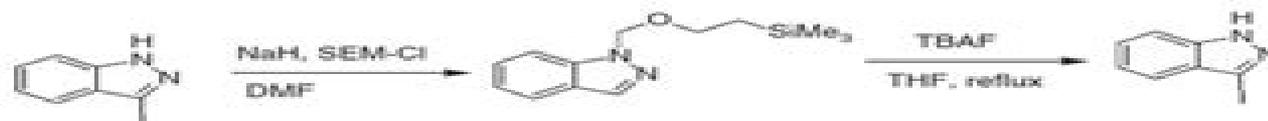
### Amines

Protection and deprotection of amino functional group are key steps in organic synthesis [1–5].

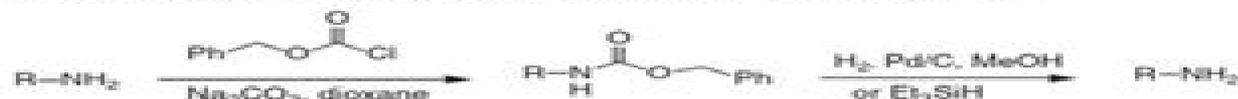
#### *tert*-Butyloxycarbonyl (Boc)



#### 2-(Trimethylsilyl)ethoxymethyl (SEM)



#### Carbobenzyloxy/Carboxybenzyl/Benzyloxycarbonyl (Cbz or Z)



# Protection And Deprotection Of Functional Groups In

**Neil Winterton**



## **Protection And Deprotection Of Functional Groups In:**

*Protective Groups in Organic Chemistry* J. McOmie, 2012-12-06 During the past decade there has been a great increase in the use of protective groups especially in the synthesis of large and complex organic molecules Perhaps the greatest activity has been in the peptide field where such triumphs as the total synthesis of insulin and of bovine ribonuclease molecular weight 13 700 have been achieved Correspondingly more protective groups have been devised for the protection of amino and imino groups than for any other functional group There are many reviews and books on the synthesis of peptides but there has been no general survey of protective groups since my own review in 1963 At that time the five main methods for the removal of protective groups involved acid or base hydrolysis reduction oxidation or thermal elimination reactions Recent advances include the use of photo sensitive and metal ion sensitive protective groups and the attachment of functional groups to reactive polymers as a method of protection during the solid phase synthesis of peptides and polynucleotides Another interesting development is the design and use of protective groups with a built in safety catch which can be released by a specific chemical reaction so that an otherwise stable bond is made labile at the appropriate moment thereby allowing the protective group to be removed under very mild conditions My own interest in protective groups dates from 1944 when as a student I gave two lectures on the subject and produced an 11 page review including 70 references

**Greene's Protective Groups in Organic Synthesis** Peter G. M. Wuts, Theodora W. Greene, 2012-12-20 The Fourth Edition of Greene's Protective Groups in Organic Synthesis continues to be an indispensable reference for controlling the reactivity of the most common functional groups during a synthetic sequence This new edition incorporates the significant developments in the field since publication of the third edition in 1998 including New protective groups such as the fluorosulfonyl family and the uniquely removable 2-methoxybenzenesulfonyl group for the protection of amines New techniques for the formation and cleavage of existing protective groups with examples to illustrate each new technique Expanded coverage of the unexpected side reactions that occur with protective groups New chart covering the selective deprotection of silyl ethers 3 100 new references from the professional literature The content is organized around the functional group to be protected and ranges from the simplest to the most complex and highly specialized protective groups

**Practical Functional Group Synthesis** Robert A. Stockland, Jr., 2016-03-16 A practical handbook for chemists performing bond forming reactions this book features useful information on the synthesis of common functional groups in organic chemistry Details modern functional group synthesis through carbon heteroatom N O P S B halogen bond forming reactions with a focus on operational simplicity and sustainability Summarizes key and recent developments which are otherwise scattered across journal literature into a single source Contains over 100 detailed preparations of common functional groups Included 25 troubleshooting guides with suggestions and potential solutions to common problems Complements the text in enhanced ebook editions with tutorial videos where the author provides an introduction to microwave assisted chemistry *Organic*

*Synthesis* Michael Smith, 2016-11-22 Organic Synthesis Fourth Edition provides a reaction based approach to this important branch of organic chemistry Updated and accessible this eagerly awaited revision offers a comprehensive foundation for graduate students coming from disparate backgrounds and knowledge levels to provide them with critical working knowledge of basic reactions stereochemistry and conformational principles This reliable resource uniquely incorporates molecular modeling content problems and visualizations and includes reaction examples and homework problems drawn from the latest in the current literature In the Fourth Edition the organization of the book has been improved to better serve students and professors and accommodate important updates in the field The first chapter reviews basic retrosynthesis conformations and stereochemistry The next three chapters provide an introduction to and a review of functional group exchange reactions these are followed by chapters reviewing protecting groups oxidation and reduction reactions and reagents hydroboration selectivity in reactions A separate chapter discusses strategies of organic synthesis and the book then delves deeper in teaching the reactions required to actually complete a synthesis Carbon carbon bond formation reactions using both nucleophilic carbon reactions are presented and then electrophilic carbon reactions followed by pericyclic reactions and radical and carbene reactions The important organometallic reactions have been consolidated into a single chapter Finally the chapter on combinatorial chemistry has been removed from the strategies chapter and placed in a separate chapter along with valuable and forward looking content on green organic chemistry process chemistry and continuous flow chemistry Throughout the text Organic Synthesis Fourth Edition utilizes Spartan generated molecular models class tested content and useful pedagogical features to aid student study and retention including Chapter Review Questions and Homework Problems A full Solutions Manual is also available online for qualified instructors to support teaching Winner 2018 Textbook Excellence Award Texty from the Textbook and Academic Authors Association Fully revised and updated throughout and organized into 19 chapters for a more cogent and versatile presentation of concepts Includes reaction examples taken from literature research reported between 2010 2015 Features new full color art and new chapter content on process chemistry and green organic chemistry Offers valuable study and teaching tools including Chapter Review Questions and Homework Problems for students Solutions Manual for qualified course instructors

**Protective Groups in Organic Synthesis** Theodora W. Greene, Peter G. M. Wuts, 1999-04-23 From the reviews of the previous editions For completeness the authors include protective groups and techniques for formation and cleavage that are seldom used as well as those that are more common Anyone who does organic synthesis must have convenient access to this book Journal of the American Chemical Society Essential to the modern synthetic organic chemist should be in the libraries of all academic governmental and industrial organizations concerned with organic synthesis Polymer News Reflecting the latest advances in protective group methodology this Third Edition of the proven laboratory reference is expanded by more than 50% providing readers with a comprehensive compendium of 1 050 of the most useful protective groups as well as 5 350 references to

original publications Protective groups are organized by six major organic functional groups hydroxyl amino carboxyl carbonyl sulfhydryl and phosphate groups the last new to this edition Also added in this edition are protection of the alkyne CH expanded coverage of protection of all groups and many new enzymatic methods of protection and deprotection Each chapter briefly describes the classes of available protective groups followed by an in depth look at the chemistry of individual protective groups their properties and the best methods of formation and cleavage Ten reactivity charts with more than 28 000 entries summarize the relative reactivities of 270 commonly used protective groups with 108 reagents This book will be an indispensable reference for synthetic chemists and students

**Green Chemistry** Syed Kazim Moosvi, Waseem Gulzar Naqash, Mohd. Hanief Najar, 2021-10-25 The book describes on an introductory level the designing of chemical processes and products so as to reduce or eliminate the use or production of toxic or hazardous substances It explains the code of conduct meant to reduce the environmental impact of any chemical process whether at laboratory scale or industrial scale The

synonyms of Green Chemistry are the Sustainable Chemistry or the low environmental impact Chemistry **Chemistry for Sustainable Technologies** Neil Winterton, 2015-11-09 The importance of reconciling the continuing needs of humankind with the protection of the environment and the earth's ability to provide for those needs is now better recognised Chemistry and chemical technology play an important role in this though not on their own Interdisciplinarity and multidisciplinary are therefore critically important concepts This book the first of its kind provides an interdisciplinary introduction to sustainability issues in the context of chemistry and chemical technology The prime objective of this book is to equip young chemists and others to better appreciate defend and promote the role that chemistry and its practitioners play in moving towards a society better able to control manage and ameliorate its impact on the ecosphere To do this it is necessary to set the ideas concepts achievements and challenges of chemistry and its application in the context of its environmental impact past present and future and the changes needed to bring about a more sustainable yet equitable world Covering aspects assumed barely addressed or neglected in previous publications it puts Green Chemistry in a much wider historic scientific technological intellectual and societal context and addresses complexities and challenges associated with attitudes to science and technology media treatment of scientific and technological controversies and difficulties in reconciling environmental protection and global development While the book stresses the central importance of rigour in the collection and treatment of evidence and reason in decision making to ensure that it meets the needs of a wide community of students it is broad in scope rather than deep It is therefore appropriate to a wide audience including practising scientists and technologists

*Comprehensive Organic Functional Group Transformations* Alan R. Katritzky, 1995-12-29 Protecting Groups in Organic Synthesis James R. Hanson, 1999-11-15 This volume provides at postgraduate student level an accessible introduction to a topic of central importance in organic synthesis It covers the main functional groups requiring protection in organic synthesis explaining why a particular protecting agent works and how an agent should be chosen Emphasis is placed

on what a protecting group is doing chemically to the structure that it is protecting Attention is given to removal of the protecting group This is a clear and thoughtful book which concentrates on explaining the chemistry It also provides a convenient point of entry to the primary literature

Science of Synthesis: Water in Organic Synthesis Shu Kobayashi, 2014-05-14 Water in Organic Synthesis is essential for the organic chemist in helping gain a thorough appreciation of the latest and most reliable available methods for using water in organic synthesis It illustrates how water can often be a viable and green solvent in the laboratory and provides a detailed introduction to the subject background information evaluated methods practical applications industrial applications special techniques and an overview of the latest trends The reference work also helps in inspiring chemists worldwide to find new approaches and techniques for the application of water in organic synthesis Comprehensive overview of a rapidly progressing field Critical review of aqueous reactions by 47 experts Covering almost all types of organic reactions Including special techniques with water and industrial applications Emphasis on environmental aspects

Amino Terminal Semisynthesis of Glucagon Kathleen Corey Flanders, 1983 *Indian Journal of Chemistry*, 2008

Science of Synthesis H. Firouzabadi, 2000 The authoritative and comprehensive reference work for the entire field of organic and organometallic synthesis The series presents the important synthetic methods for all classes of compounds

**Protecting Groups** Philip J. Kocienski, 2005 The didactic presentation of the material makes this book an essential bench top tool not only for specialists in organic chemistry but also for students and all those involved in the preparation of organic molecules Key Features A critical survey of the most used protecting groups as used by organic chemists Organization based on functional groups hydroxyl diol carbonyl carboxyl amine Special emphasis placed on deprotection conditions applied to complex structures where selectivity is a prime issue Transformations accompanied by key experimental details Examples from the recent literature span a wide domain of organic synthesis Over 500 schemes aid visual retrieval End of chapter list reviews which amplify topics covered

Functional Polymers Abhimanyu O. Patil, 1998 The intent of this volume is to review modern synthetic methods for functional polymers and examine some novel structures associated with these polymers

Main Group Metal Chemistry, 1997 Bulletin of the Korean Chemical Society, 2005

**Strategies and Tactics in Organic Synthesis** Thomas James Lindberg, Michael Harmata, 2008 *Acid Catalysis in Modern Organic Synthesis* Hisashi Yamamoto, Kazuaki Ishihara, 2008 This two volume set covers all new developments and in addition includes the hot concept of combined Bronsted and Lewis acid catalysis developed by Hisashi Yamamoto himself The excellent editorial team has put together an equally top team of expert authors resulting in a true treasure trove of essential information making this a must for every chemist working in organic chemistry and catalysis in academia as well as in industry Publisher's description

**Combinatorial Synthesis of Hydantoin Library with Isoxazoline Heterocycle** Kyung-Ho Park, 2000

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