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BOOK REVIEW

Carbohydrate Chemistry: Proven Synthetic Methods, Vol 3, Proven Synthetic Methods Series, Pavol Kováč, Ed

Boca Rotan, FL 2013, 329 pages, CRC Press, Taylor and Francis Group, etc. April 23, 2015 by CRC Press Reference - 329 Pages - 220 B/W Illustrations ISBN 9781466583573 - CAT# K18997

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The readers of this volume, whether new to the specialty of carbohydrate synthesis or experienced scientists in the field, will get a broad sampling of experimental methods and reactions in tested detail and the challenges associated with synthesizing biologically relevant carbohydrates. The synthetic challenges associated with carbohydrate synthesis require use of a wide variety of protection / deprotection methods, control of regio- and stereoselective reactions, separation techniques, isolation and characterization of products from reaction mixtures, and the list goes on. In short, successful carbohydrate syntheses require application of good-to-excellent laboratory skills, attention to detail and most importantly, patience. Successful application of any complex methodology benefits from the availability of high quality and reliable examples and procedures as references and models, an emerging role that this series plays in the field of carbohydrate synthesis.

This review is of Volume 3 in Carbohydrate Chemistry: Proven Synthetic Methods, the latest addition to a series dedicated to publishing carefully worked out and checked experimental procedures for synthesis of suitably protected sugars as building blocks for more complex glycosidic structures. More simply put, this volume, and the two previous volumes in the series, provide practical and tested experimental procedures for synthesizing building block reagent sugars for constructing glycans of interest in biological settings.

The first group of submissions in the volume is labeled as *Synthetic Methods*, that section contains seventeen articles, each one emphasizing a different synthetic method applicable to a successful synthetic carbohydrate procedure. Some examples of the methods described are transformations focused on synthesis of higher carbon sugars, regioselective and stereoselective transformations, microwave irradiation induced reactions, metal free oxidative lactonization, a selective deprotection procedure, etc.

The second group of submissions in the volume is labeled as *Synthetic Intermediates*, a section with 15 entries, each providing a detailed laboratory synthesis of a different protected small molecule carbohydrate targeted for use in preparation of more complex carbohydrate structures. The following three synthetic intermediates are given as examples: ethyl 1-thio-α-D-galactofuranoside; 2-acetamido-3,4,6-tri-*O*-acetyl-2-deoxy-1-*O*-*p*-nitrophenoxycarbonyl-α-D-glucopyranose, and 7-deoxy-1,2:3,4-di-*O*-isopropylidene-D-glycero-α-D-*galacto*-heptopyranose. I include these names to underscore the reality that naming carbohydrates can be almost as complicated as their synthesis.

What makes these volumes particularly impressive is the structured format for each article which requires that the article provide critical and practical information on the subject covered. Unfortunately, experimental details and appropriate analytical results are too often found lacking in published peer reviewed articles, which clearly limits their scientific credibility and usefulness to a reader. The published procedures in this series are required to be as complete and accurate as possible, which adds to their credibility. As an example, this reviewer finds inclusion of NMR signal assignments of compounds within an Experimental section of considerable value in support of correct structure assignment. Many other publications in the field only allow unassigned chemical shifts and coupling constants, which can leave the reader guessing. The emphasis in this series is publication of reliable and complete

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carbohydrate synthetic experimental procedures and appropriate analytical support, no exceptions made. That is what the Series Editor, Pavol Kováč, set out to do when he initiated this series, and those standards are applied in this volume as well. Book Editors for this volume, René Roy and Sébastien Vidal, are also to be complimented for their roles in producing such a high quality scientific publication as it contributes to the "art and science" of carbohydrate synthesis.

The goals in publication of each of the volumes in this series are clearly stated in the introduction of this volume: "Our book series is intended to help organic chemists but also biologists and biochemists who aim to obtain synthetic compounds with limited efforts and assurance of success when following every step of the synthetic process described in the chapters." In this reviewer's opinion this volume and the previous two volumes have met the above intentions.

To the Editors I would say that I believe by continuing to adhere to the high quality publication standards already set for this series, awareness of the technical importance and reliability of the volumes will continue to grow. With that recognition in the synthetic carbohydrate world, published volumes in this series clearly serve as models for what synthetic carbohydrate publications should look like. Finally, worry not about the quality of other publications you can't impact in any way. Instead, continue to publish high quality descriptions of useful synthetic carbohydrate methods and synthetic intermediates and hope that other publications will follow your lead. This series has a bright future if the Editors are up to the task.

I feel obligated to end this review by commenting on the Series Editor's very strong editorial position, presented in all three volumes to date, related to the increasing poor quality of published papers in the field of synthetic carbohydrate chemistry. I appreciate the effort the Editor has made in support of his concerns, and I generally agree with his remarks and regrettably am also disheartened by the poor quality of far too many published reports. However, in my opinion this case has been exhaustively made and does not merit any mention in future volumes - let it rest.