

# **THE CHEMISTRY OF ENZYME ACTIONS**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649492770

The Chemistry of Enzyme Actions by K. George Falk

Except for use in any review, the reproduction or utilisation of this work in whole or in part in any form by any electronic, mechanical or other means, now known or hereafter invented, including xerography, photocopying and recording, or in any information storage or retrieval system, is forbidden without the permission of the publisher, Trieste Publishing Pty Ltd, PO Box 1576 Collingwood, Victoria 3066 Australia.

All rights reserved.

Edited by Trieste Publishing Pty Ltd.  
Cover @ 2017

This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this condition being imposed on the subsequent purchaser.

[www.triestepublishing.com](http://www.triestepublishing.com)

**K. GEORGE FALK**

**THE CHEMISTRY OF  
ENZYME ACTIONS**



# THE CHEMISTRY OF ENZYME ACTIONS

BY

K. GEORGE FALK

HARRIMAN RESEARCH LABORATORY,  
The Roosevelt Hospital  
NEW YORK



American Chemical Society  
Monograph Series

STANFORD LIBRARY

BOOK DEPARTMENT

*Ur*  
The CHEMICAL CATALOG COMPANY, Inc.  
ONE MADISON AVENUE, NEW YORK, U. S. A.

1921

540.6

✓.512m

COPYRIGHT, 1920, BY  
The CHEMICAL CATALOG COMPANY, Inc.  
*All Rights Reserved*

733513

WILLIAM C. BRAY

Press of  
J. J. Little & Ives Company  
New York, U. S. A.

## GENERAL INTRODUCTION

### American Chemical Society Series of Scientific and Technologic Monographs

By arrangement with the Interallied Conference of Pure and Applied Chemistry, which met in London and Brussels in July, 1919, the American Chemical Society was to undertake the production and publication of Scientific and Technologic Monographs on chemical subjects. At the same time it was agreed that the National Research Council, in cooperation with the American Chemical Society and the American Physical Society, should undertake the production and publication of Critical Tables of Chemical and Physical Constants. The American Chemical Society and the National Research Council mutually agreed to care for these two fields of chemical development. The American Chemical Society named as Trustees, to make the necessary arrangements for the publication of the monographs, Charles L. Parsons, Secretary of the American Chemical Society, Washington, D. C.; John E. Teeple, Treasurer of the American Chemical Society, New York City; and Professor Gellert Alleman of Swarthmore College. The Trustees have arranged for the publication of the American Chemical Society series of (a) Scientific and (b) Technologic Monographs by the Chemical Catalog Company of New York City.

The Council, acting through the Committee on National Policy of the American Chemical Society, appointed the editors, named at the close of this introduction, to have charge of securing authors, and of considering critically the manuscripts prepared. The editors of each series will endeavor to select topics which are of current interest and authors who are recognized as authorities in their respective fields. The list of monographs thus far secured appears in the publisher's own announcement elsewhere in this volume.

The development of knowledge in all branches of science, and especially in chemistry, has been so rapid during the last fifty years and the fields covered by this development have been so varied that

it is difficult for any individual to keep in touch with the progress in branches of science outside his own specialty. In spite of the facilities for the examination of the literature given by Chemical Abstracts and such compendia as Beilstein's *Handbuch der Organischen Chemie*, Richter's *Lexikon*, Ostwald's *Lehrbuch der Allgemeinen Chemie*, Abegg's and Gmelin-Kraut's *Handbuch der Anorganischen Chemie* and the English and French Dictionaries of Chemistry, it often takes a great deal of time to coordinate the knowledge available upon a single topic. Consequently when men who have spent years in the study of important subjects are willing to coordinate their knowledge and present it in concise, readable form, they perform a service of the highest value to their fellow chemists.

It was with a clear recognition of the usefulness of reviews of this character that a Committee of the American Chemical Society recommended the publication of the two series of monographs under the auspices of the Society.

Two rather distinct purposes are to be served by these monographs. The first purpose, whose fulfilment will probably render to chemists in general the most important service, is to present the knowledge available upon the chosen topic in a readable form, intelligible to those whose activities may be along a wholly different line. Many chemists fail to realize how closely their investigations may be connected with other work which on the surface appears far afield from their own. These monographs will enable such men to form closer contact with the work of chemists in other lines of research. The second purpose is to promote research in the branch of science covered by the monograph, by furnishing a well digested survey of the progress already made in that field and by pointing out directions in which investigation needs to be extended. To facilitate the attainment of this purpose, it is intended to include extended references to the literature, which will enable anyone interested to follow up the subject in more detail. If the literature is so voluminous that a complete bibliography is impracticable, a critical selection will be made of those papers which are most important.

The publication of these books marks a distinct departure in the policy of the American Chemical Society inasmuch as it is a serious attempt to found an American chemical literature without primary regard to commercial considerations. The success of the venture will depend in large part upon the measure of cooperation which can be secured in the preparation of books dealing adequately with topics of general interest; it is earnestly hoped therefore that every



member of the various organizations in the chemical and allied industries will recognize the importance of the enterprise and take sufficient interest to justify it.

## AMERICAN CHEMICAL SOCIETY

## BOARD OF EDITORS

## Scientific Series:—

WILLIAM A. NOYES, *Editor*,  
GILBERT N. LEWIS,  
LAFAYETTE B. MENDEL,  
ARTHUR A. NOYES,  
JULIUS STIEGLITZ.

## Technologic Series:—

JOHN JOHNSTON, *Editor*,  
C. G. DERICK,  
WILLIAM HOSKINS,  
F. A. LIDBURY,  
ARTHUR D. LITTLE,  
C. L. REESE,  
C. P. TOWNSEND.

American Chemical Society  
**MONOGRAPH SERIES**

Other monographs in the series of which this book is a part are in process of being printed or written. They will be uniform in size and style of binding. The list up to December First, 1920, includes:

**The Animal as a Converter.**

By HENRY PRENTISS ARMSBY. About 250 to 300 pages, illustrated.

**Chemical Effects of Alpha Particles and Electrons.**

By SAMUEL C. LIND. About 150 pages, illustrated.

**The Properties of Electrically Conducting Systems.**

By CHARLES A. KRAUS. About 400 pages, illustrated.

**Carotinoids and Related Pigments: The Chromolipins.**

By LEROY S. PALMER. About 200 pages, illustrated.

**Thyroxin.**

By E. C. KENDALL.

**The Properties of Silica and the Silicates.**

By ROBERT B. SOSMAN. About 500 pages, illustrated.

**Organic Mercury Compounds.**

By FRANK C. WHITMORE. About 300 pages.

**Coal Carbonization.**

By HORACE C. PORTER. About 475 pages, illustrated.

**The Corrosion of Alloys.**

By C. G. FINK.

**Industrial Hydrogen.**

By HUGH S. TAYLOR. About 200 pages, illustrated.

**The Vitamines.**

By H. C. SHERMAN. About 200 pages, illustrated.

For additional information regarding this series of monographs, see General Introduction, page 3. As the number of copies of any one monograph will be limited, advance orders are solicited.

*The* CHEMICAL CATALOG COMPANY, Inc.  
ONE MADISON AVENUE, NEW YORK, U. S. A.

## CONTENTS

CHAPTER	PAGE
I. INTRODUCTION . . . . .	11
II. VELOCITIES OF CHEMICAL REACTIONS . . . . .	20
III. GENERAL THEORY OF CHEMICAL REACTIONS; CATALYSIS . . . . .	32
IV. CHEMICAL REACTIONS CATALYZED BY ENZYMES . . . . .	43
V. PHYSICAL PROPERTIES COMMON TO ENZYME PREPARATIONS . . . . .	56
VI. CHEMICAL PROPERTIES COMMON TO ENZYME PREPARATIONS . . . . .	68
VII. CHEMICAL NATURE OF CERTAIN ENZYMES . . . . .	81
VIII. MECHANISM OF ENZYME ACTIONS . . . . .	99
IX. USES AND APPLICATIONS OF ENZYMES . . . . .	114
X. PRESENT STATUS OF ENZYME PROBLEM . . . . .	123
INDEX . . . . .	133