

**AN INTRODUCTION
TO CHEMICAL
CRYSTALLOGRAPHY**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649486410

An Introduction to Chemical Crystallography by P. Groth

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

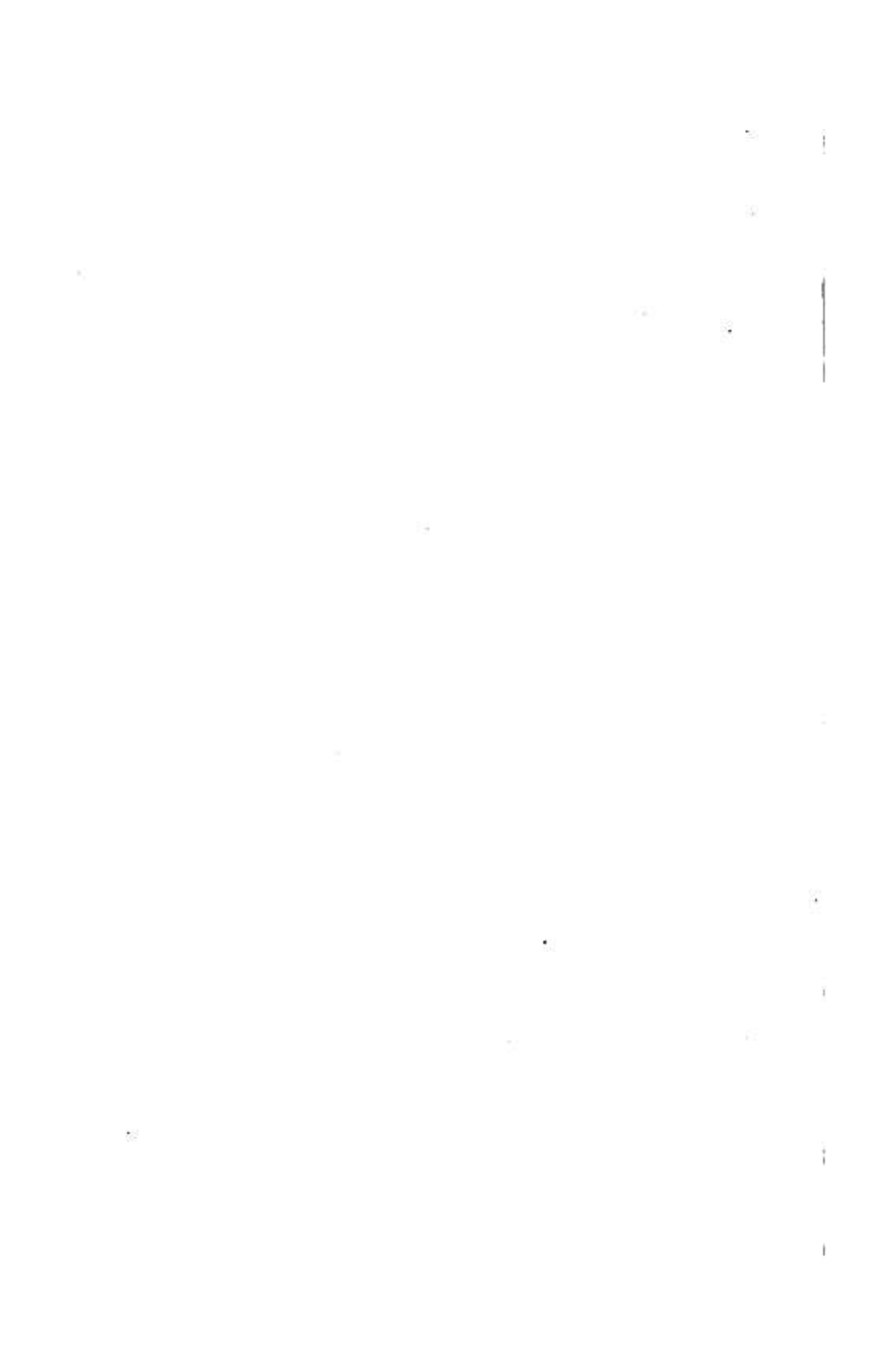
This book is sold subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out, or otherwise circulated without the publisher's prior consent in any form or binding or cover other than that in which it is published and without a similar condition including this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

www.triestepublishing.com

P. GROTH

**AN INTRODUCTION
TO CHEMICAL
CRYSTALLOGRAPHY**

CHEMICAL CRYSTALLOGRAPHY



QD
951
G88

AN INTRODUCTION TO
CHEMICAL CRYSTALLOGRAPHY

BY

P. GROTH

PROFESSOR OF MINERALOGY AND CRYSTALLOGRAPHY IN THE UNIVERSITY OF MUNICH

AUTHORISED TRANSLATION

BY

HUGH MARSHALL, D.Sc., F.R.S.

LECTURER ON CHEMISTRY AND ON MINERALOGY AND CRYSTALLOGRAPHY
IN THE UNIVERSITY OF EDINBURGH

NEW YORK
JOHN WILEY & SONS
43-45 EAST NINETEENTH STREET

1906

H101.219

Library of the
Mineralogical Laboratory

MAY 17 1918

Gift of G. Palache

Printed in Great Britain

PREFACE

IN this short treatise on general chemical crystallography the attempt has been made to present the hitherto recognised relations between the properties of crystallised substances and their chemical constitution on the basis of a definite view regarding the structure of crystals. In doing so, a knowledge of the crystallographical laws is assumed, to an extent corresponding to the elementary treatment of them as contained in my text book, *Physikalische Krystallographie*, now appearing in its fourth edition; for information regarding the terms here employed, and also for a fuller introduction to the theory of crystal structure, together with the geometrical ideas requisite thereto, the reader is referred to the above work. In order to secure a maximum of conciseness and brevity in the treatment, it has been necessary to forego entering more fully into the different views which at various times have been propounded regarding the matter in question. Anyone who wishes information regarding the history of the development of chemical crystallography, will find a short historical treatment of the subject in Section III. of the *Introduction to Chemical Crystallography*, by A. Fock (Leipzig, 1888), and especially in the extended English version of the same work, by W. J. Pope (Oxford, 1895); there is a detailed and complete statement in the excellent work by A. Arzruni, *Physikalische Chemie der Krystalle* (Brunswick, 1893), which also constitutes Part I. of Graham-Otto's *Ausführliches Lehrbuch der Chemie*. Subsequent investigations in this field are contained in the various volumes of the *Zeitschrift*

für Krystallographie, partly in the form of original contributions, partly as abstracts.

The investigation of the dependence of the properties of crystallised substances on their chemical nature naturally belongs to the domain of physical chemistry, whose votaries, however, during the period of the rapid development of this branch of science, have busied themselves chiefly with the study of amorphous substances (and especially of solutions). Only quite recently have they begun to turn their attention to crystallised substances, and numerous investigations have been published, particularly concerning so-called "mixed crystals," but mostly confined to theoretical deductions from the phase rule, or to the determination and discussion of fusion curves. However valuable such investigations may be, they can never take the place of the exact examination of the crystallisation products themselves (as is evident from the fact that substances have been designated as "isomorphous" merely on the evidence of the fusion curves of their mixtures, even although nothing was known regarding their crystallographical relationships). This arises from the circumstance that the laws observed with amorphous substances cannot be directly applied to crystallised substances, which are essentially so different from them; and especially from the fact that many things of totally distinct nature, whose differentiation still requires further investigation, are thrown together under the name of "solid solutions." The physical crystallographical methods necessary for this have in recent times been so perfected that, in order to shed light on these matters, only their general employment on the part of physical chemists is necessary; and it is an additional aim of this book to discuss the vantage points whence, as the result of further investigation, there might open up the prospect of substituting for the mere isolated relationships which, so far, have been observed to exist between the crystal properties and the chemical constitution of substances, the recognition of some

general law—a goal whose attainment will certainly be made distinctly easier by the great advances which the theoretical investigation of crystal structure has made in recent times. Bearing these points in mind, chemical crystallography should constitute one of the most highly favoured and profitable fields of research in the whole domain of physical chemistry.

In conclusion, it may be remarked that the present work at the same time forms a forerunner to a systematic and critical digest of the now-existing researches on the crystal forms and other physical properties of crystallised substances, which for a series of years I have been preparing. For this work the Royal Academies of Sciences in Vienna, Berlin, Leipzig, and Munich have in recent years placed at my disposal assistance in the persons of Dr Gossner and Dr Hlawatsch; to these must also be added Dr Steinmetz, whose research, frequently mentioned in this work, will shortly be published. As a result of this assistance, it has been possible so to advance the preparations that the printing of the work will soon be commenced.

P. GROTH.

MUNICH, *September* 1904.