

MATERIALS TECHNOLOGY FOR ELECTRON TUBES

by

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BOOK DIVISION
REINHOLD PUBLISHING CORPORATION
330 West Forty-second St., New York, U.S.A.

1951

PREFACE

It is the purpose of this book to present the physical characteristics of the solids used in the fabrication of vacuum tubes and to describe some of the processes for the application of these materials. It had often occurred to me, during my prolonged activity in this field, that such a text should be useful to the tube designer, development engineer and technician alike, especially since no English text is available, so far, to take the place of the now classic treatise by Espe and Knoll.*

The contents will give a fair idea of the scope of the book. The selection of the subjects was naturally dictated by my personal experience but as broad a base as possible was attempted. This turned out to be a rather formidable task since so many disciplines of science enter into Vacuum Tube Technology that no one person can claim to be competent in all of them. For this reason, all of the chapters have been submitted for review to a number of experts in the various fields who generously supplied additional data and helped to make the text more concise. A number of subjects, which might be expected in a book of this kind, have been omitted, especially those on which specialized treatises have become available recently. This refers to luminescence of solids, the treatment of gases and vapors, electron emission and high vacuum technique. A summary and guide to the literature of High Vacuum Technique and Electron Emission as well as several tables, are given in the last two chapters.

Extensive references are listed at the end of each chapter and the index of authors and subjects has been prepared with some care in order to permit the reader to extend his studies in the literature.

Beyond the field of electronics, the book should be of some value to materials engineers in related fields where glass, ceramics and metals are used. The chapter on Solders and Brazes will of course be of general interest to experimenters in all fields. The book is essentially non-mathematical although there are a few pages where equations do occur.

I would be grateful if the readers would point out mistakes and omissions of which there must be many in spite of a sincere effort to avoid them.

It is my pleasant duty to thank the management of the Collins Radio Company for their generous support of this work. Their help made this

* "Werkstoffkunde der Hochvakuumtechnik," Verlag Julius Springer, Berlin, 1936.

book a practical reality. At the same time, it must be said that the content of the book has in no way been restricted by this support and that anything stated in it does not commit the Collins Radio Company but is entirely my own responsibility. I am deeply indebted to Dr. Winfield W. Salisbury, Director of Research of the Collins Research Division,* for his continued interest, friendly encouragement and trust in seeing this job through to the end. It is, therefore, a great pleasure to dedicate this book to him who had the vision and confidence that something worthwhile might be achieved by writing it.

I tender my sincere thanks to the many reviewers and their companies or institutions who have so generously cooperated in this venture. The names and affiliations of these reviewers are listed below together with the numbers of the chapters on which they cooperated. This acknowledgement does not imply that the reviewers in question are in any way committed by the text or that they agree with all details. Many others have read the manuscript and either simply voiced their approval or, in spite of substantial contributions, have preferred not to be mentioned. The selection of reviewers has been quite arbitrary and was mostly dictated by my personal or indirect contact with them and their further suggestion of other names.

Also listed are the publishing houses, institutions, and companies who have kindly given permission to use text excerpts, graphs, tables, and illustrations from their publications as acknowledged in the text.

This venture was begun, on the constant urging of my publisher, during the summer of 1948 and the manuscript was completed at the end of 1950. The various chapters were written in the sequence in which they are presented in this book. The following members of the staff of Collins Radio Company had a large share in processing the book. Mrs. Betty Krejci typed and retyped the manuscript and took care of its extensive distribution. Mrs. Jean Van Cura handled the voluminous correspondence connected with these activities. Bernard Erlacher and Charles Kurka prepared most of the line drawings and John Ridge and Don Hanson the photographs.

The relations with the publisher have been very pleasant indeed. Messrs. F. M. Turner, F. P. Peters and G. G. Hawley of the Reinhold Publishing Corporation supported the venture most generously and left me a completely free hand in carrying it out. The care which they, on their part, applied to all details, should be reflected in the book's final appearance. To all these I am most grateful.

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Last, but not least I am indebted to my wife who not only endured my prolonged preoccupation with this venture but was a continuous source of encouragement and helped by reading the proofs and preparing part of the index.

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Cedar Rapids, Iowa
January 2, 1951.

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