

# Preface

This textbook is intended for a one-semester course in corrosion science at the graduate or advanced undergraduate level. The approach is that of a physical chemist or materials scientist, and the text is geared toward students of chemistry, materials science, and engineering. This textbook should also be useful to practicing corrosion engineers or materials engineers who wish to enhance their understanding of the fundamental principles of corrosion science.

It is assumed that the student or reader does not have a background in electrochemistry. However, the student or reader should have taken at least an undergraduate course in materials science or physical chemistry. More material is presented in the textbook than can be covered in a one-semester course, so the book is intended for both the classroom and as a source book for further use.

This book grew out of classroom lectures which the author presented between 1982 and the present while a professorial lecturer at George Washington University, Washington, DC, where he organized and taught a graduate course on “Environmental Effects on Materials.” Additional material has been provided by over 30 years of experience in corrosion research, largely at the Naval Research Laboratory, Washington, DC and also at the Bethlehem Steel Company, Bethlehem, PA and as a Robert A. Welch Postdoctoral Fellow at the University of Texas.

The text emphasizes basic principles of corrosion science which underpin extensions to practice. The emphasis here is on corrosion in aqueous environments, although a chapter on high-temperature oxidation has also been included. The overall effort has been to provide a brief but rigorous introduction to corrosion science without getting mired in extensive individual case histories, specific engineering applications, or compilations of practical corrosion data. Some other possible topics of interest in the field of corrosion science have not been included in accordance with the goal to keep the material introductory in nature and to keep the size of the book manageable. In addition, references are meant to be illustrative rather than exhaustive.

Most chapters also contain a set of problems. Numerical answers to problems are found at the end of the book.

Finally, the author wishes to recognize the various mentors who have graciously shaped his professional life. These are: Dr. J. B. Horton and A. R. Borzillo of the Bethlehem Steel Corporation, who introduced the author to the field of corrosion; the late Prof. A. C. Zettlemoyer of Lehigh University, who taught the author the beauty of surface chemistry while his Ph. D. advisor; the late Dr. Norman Hackerman, postdoctoral mentor at the University of Texas; the late Dr. B. F. Brown and M. H. Peterson of the Naval Research Laboratory; and Prof. James P. Wightman of the Virginia Polytechnic Institute and State University, a “surface agent extra-ordinaire” with whom the author has spent an enjoyable and exciting sabbatical year.

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E. McCafferty

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McCafferty, E.

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