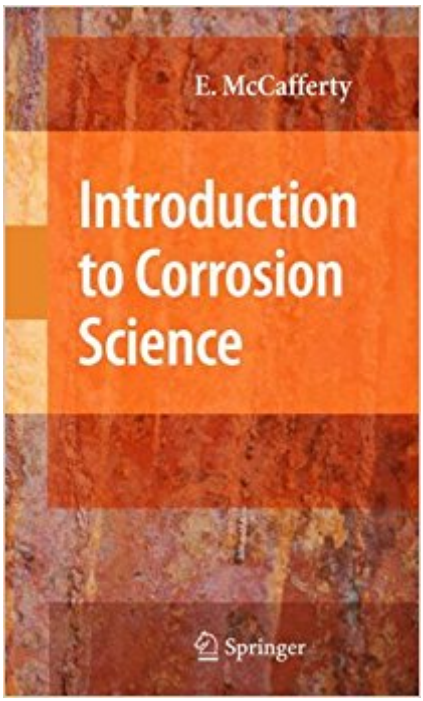
Introduction To Corrosion Science



Synopsis

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 Ã¢â ¬Å“Environmental Effects on Materials.Ã¢â ¬Â• 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.

Book Information

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Customer Reviews

From the reviews:Ã¢â ¬Å“The author does an excellent job guiding both the novice and expert

corrosion scientist through the content with a clear, concise writing style. Ã¢â ¬Â¦ a wide selection of problems at the end of most chapters allows students to test their understanding of the material. Ã¢â ¬Â¦ While the text is definitely intended for use in a graduate or advanced undergraduate lecture course in corrosion science, the text would also make an excellent reference for anyone teaching a course in environmental science or electrochemistry.Ã¢â ¬Â• (Lester L. Pesterfield, Journal of Chemical Education, Vol. 89, 2012)Ã¢â ¬Å“Introduction to corrosion science is absolutely Ã¢â ¬Ëœthe bookÃ¢â ¬â„¢ that any student of chemistry, material science and/or engineering studying corrosion science should have on their desk. It contains everything one needs to know about the fundamental principles of corrosion. Ã¢â ¬Â¦ Although this textbook is primarily intended for a one-semester course in corrosion science Ã¢â ¬Â¦ I find it also beneficial as a comprehensive reference book for professionals. Without a doubt, I would highly recommend it to everyone; this book is simply a Ã¢â ¬Ëœmust haveÃ¢â ¬â„¢.Ã¢â ¬Â• (Amela KeseroviÃ„â ¡, Materials and Corrosion, Vol. 63 (11), 2012)Ã¢â ¬Å“I also used this book for a Corrosion Engineering course. Ã¢â ¬Â¦ It has the most comprehensive description of electric double-layer theory IÃ¢â ¬â„¢ve seen in any text so far. Ã¢â ¬Â¦ The images and diagrams are all nicely laid out. Ã¢â ¬Â¦ Since purchasing this book IÃ¢â ¬â„¢ve browsed through about three or four other corrosion texts and still like this one the best.Ã¢â ¬Â• (.com, December, 2011)

Introduction to Corrosion Science is suitable for a one-semester course in corrosion science at the graduate or advanced undergraduate level for students that do not have backgrounds in electrochemistry but have taken introductory courses in materials science or physical chemistry. The text follows the approach of a physical chemist or materials scientist and is geared toward students of physical chemistry, materials science, and engineering. In addition, practicing corrosion engineers and materials engineers will find useful information that will broaden their understanding of the fundamental principles of corrosion science. This textbook grew out of classroom lectures, which the author presented as a Professorial Lecturer at George Washington University, Washington, D.C. Chapters on: o Charged interfaces o Electrochemical cells o Thermodynamics of corrosion o Corrosion kinetics and mixed potential theory o Concentration polarization and diffusion o Passivity o Crevice corrosion and pitting o Stress-corrosion cracking and corrosion fatigue o Corrosion inhibitors o Corrosion under organic coatings o AC impedance o High temperature oxidation Ã Â Key features: o Detailed illustrations o Worked example problems o Problem sets after each chapter o Extensive references o Appendices to show the origin of important equations Ã Â About the author: Dr. E. McCafferty is a Professorial Lecturer at George Washington

University and a consultant to the Naval Research Laboratory, Washington D.C., where he has conducted research in corrosion science for over thirty years.

I've bought this book for a one semester undergraduate corrosion engineering course. I must say that I'm absolutely thrilled with this book! The author has a concise and enjoyable writing style which allows for hours of continuous reading.The book covers quite well the most fundamental topics in corrosion science. I was particularly happy with the author's coverage of polarization - a topic whose importance can't be stressed enough, and which can be quite tricky for first-timers. The Wagner-Traud models are presented satisfactorily and the Tafel extrapolation is well explained. Pourbaix diagrams must be pointed out as one of the strengths of this book, since the author essentially builds one of them from scratch - applying Nernst's equation and equillibrium constants - in a very ditatic fashion.The books also covers important topics such as pitting, crevice corrosion (with mechanisms), coatings and inhibitors. The author also describes many corrosion science techniques, among which is AC impedance, which has been very well covered.While this book is definitely suited as an introductory textbook, I would not recommend it as a thorough reference book for professionals. Even though this might be seen as a flaw, I've still decided to give it a 5 stars.Recommended.

I also used this book for a Corrosion Engineering course. I initially purchased it as a supplementary text after finding the required text (Jones) difficult to understand and error-prone. It has the most comprehensive description of electric double-layer theory I've seen in any text so far. It covers thermodynamics thoroughly and has an entire chapter on Pourbaix diagrams. It appropriately makes use of chemical activity in place of concentration as in some other texts. It uses the calorie instead of Joules (possible drawback?). It has nice example problems throughout the chapters and end of chapter problems with selected answers in the back. The chapter on kinetics has proved very useful to me for both theoretical and experimental aspects in that it explains mixed potential theory well and contains tables with corrosion rate data obtained from various studies. The images and diagrams are all nicely laid out. The sections within the chapters are not numbered which forces me to page around a bit to remind myself where I am in the chapter. Since purchasing this book I've browsed through about three or four other corrosion texts and still like this one the best.

page number and figure unorganized in this electronic version

just what I looked for in my scientific literature research. simple, without to much mathematical theory, useful for all who start with corrosion science

Useful for my corrosion class. The practice problems are a good review for tests and cover the important parts of each chapter.

This book does a really good job of introducing corrosion science and how it is studied.

Advances in Corrosion Science and Technology: Volume 6 (Advances in Corrosion Science & Technology) Introduction to Corrosion Science The Boatowner's Guide to Corrosion The Corrosion of Character: The Personal Consequences of Work in the New Capitalism So Damn Much Money: The Triumph of Lobbying and the Corrosion of American Government Intelligent Coatings for Corrosion Control Handbook of Corrosion Engineering 2/E Stress-Corrosion Cracking: Materials Performance and Evaluation, Second Edition Principles and Prevention of Corrosion (2nd Edition) Corrosion Control in the Oil and Gas Industry Two-Phase Cooling And Corrosion In Nuclear Power Plants Freezing Colloids: Observations, Principles, Control, and Use: Applications in Materials Science, Life Science, Earth Science, Food Science, and Engineering (Engineering Materials and Processes) Reference and Information Services: An Introduction, 5th Edition: An Introduction (Library and Information Science Text) Introduction to Nanoscale Science and Technology (Nanostructure Science and Technology) Introduction to Plant Science: Revised Edition (Texas Science) Introduction to Quantum Mechanics: in Chemistry, Materials Science, and Biology (Complementary Science) Science for the Curious Photographer: An Introduction to the Science of Photography SPORTS SCIENCE EXPERIMENT LOG GET A KICK OUT OF SCIENCE (MAD SCIENCE) Science Experiments For Kids: 40 + Cool Kids Science Experiments (A Fun & Safe Kids Science Experiment Book) SCIENCE EXPLORER C2009 LEP STUDENT EDITION PHYSICAL SCIENCE (Prentice Hall Science Explorer)