

# CORROSION AND SURFACE CHEMISTRY OF METALS

Dieter Landolt

This book provides a comprehensive and unified understanding of the surface chemistry and electrochemistry of metals, applied to the critical subject of corrosion and protection. Because corrosion phenomena are largely electrochemically driven, the book begins with the basics of the thermodynamics and kinetics of electrochemical reactions and a discussion of the chemical and physical nature of metal surfaces and interfaces. The attention then turns to the experimental study and theoretical interpretation of corrosion reactions that take place at metal surfaces and thin oxide films; the entire toolkit of the modern surface chemist is described in the context of the metal corrosion and wear. The second part of the book presents a wide range of corrosion phenomena found in practice, grouped according to their mechanism and environmental conditions. Metallic wear, both alone and in the presence of corrosion, is treated, and a final chapter presents an overview of different approaches to corrosion protection and their principles. The book thus presents a thorough introduction to modern corrosion science and engineering.

Richly illustrated and with a careful mathematical development of the basic scientific concepts, this book is intended for both university students and professional engineers. With a set of study problems for each chapter, the book can be easily adopted for classroom use.

*DIETER LANDOLT received his Ph.D. degree from the Swiss Federal Institute of Technology in Zurich in 1965. He worked as a postdoctoral researcher at the University of California in Berkeley before joining the University of California in Los Angeles (UCLA) as Assistant Professor. In 1972 he was appointed Professor of Materials Science at the Swiss Federal Institute of Technology in Lausanne (EPFL) where he directed the Laboratory of Metallurgical Chemistry until 2003. At present he is Professor emeritus at the Institute of Materials of EPFL. Dieter Landolt has published well over 300 papers in the areas of electrochemistry, surface chemistry and corrosion and has received a number of international awards, including the Cavallaro and EFC medals of the European Federation of Corrosion. He served as President of the International Society of Electrochemistry (ISE) and as Chairman of the International Corrosion Council (ICC). He is a Fellow of ECS and an Honorary Member of ISE.*

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