

1. Record Nr.	UNINA9910876665103321
Autore	Revie R. Winston (Robert Winston), <1944->
Titolo	Corrosion and corrosion control : an introduction to corrosion science and engineering / / R. Winston Revie, Herbert H. Uhlig
Pubbl/distr/stampa	Hoboken, N.J., : Wiley-Interscience, c2008
ISBN	9786611237578 9781523115518 1523115513 9781281237576 1281237574 9780470277270 0470277270 9780470277256 0470277254
Edizione	[4th ed.]
Descrizione fisica	1 online resource (512 p.)
Altri autori (Persone)	UhligHerbert Henry <1907->
Disciplina	620.1 620.11223
Soggetti	Corrosion and anti-corrosives Corrosion resistant materials
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	CORROSION AND CORROSION CONTROL; CONTENTS; Preface; 1 DEFINITION AND IMPORTANCE OF CORROSION; 1.1 Definition of Corrosion; 1.1.1 Corrosion Science and Corrosion Engineering; 1.2 Importance of Corrosion; 1.3 Risk Management; 1.4 Causes of Corrosion; 1.4.1 Change in Gibbs Free Energy; 1.4.2 Pilling-Bedworth Ratio; References; General References; Problems; 2 ELECTROCHEMICAL MECHANISMS; 2.1 The Dry-Cell Analogy and Faraday's Law; 2.2 Definition of Anode and Cathode; 2.3 Types of Cells; 2.4 Types of Corrosion Damage; References; General References; Problems 3 THERMODYNAMICS: CORROSION TENDENCY AND ELECTRODE POTENTIALS3.1 Change of Gibbs Free Energy; 3.2 Measuring the Emf of a Cell; 3.3 Calculating the Half-Cell Potential-The Nernst Equation; 3.4

The Hydrogen Electrode and the Standard Hydrogen Scale; 3.5 Convention of Signs and Calculation of Emf; 3.6 Measurement of pH; 3.7 The Oxygen Electrode and Differential Aeration Cell; 3.8 The Emf and Galvanic Series; 3.9 Liquid Junction Potentials; 3.10 Reference Electrodes; 3.10.1 Calomel Reference Electrode; 3.10.2 Silver-Silver Chloride Reference Electrode; 3.10.3 Saturated Copper-Copper Sulfate Reference Electrode; References; General References; Problems; Answers to Problems; 4 THERMODYNAMICS: POURBAIX DIAGRAMS; 4.1 Basis of Pourbaix Diagrams; 4.2 Pourbaix Diagram for Water; 4.3 Pourbaix Diagram for Iron; 4.4 Pourbaix Diagram for Aluminum; 4.5 Pourbaix Diagram for Magnesium; 4.6 Limitations of Pourbaix Diagrams; References; General References; Problems; Answers to Problem; 5 KINETICS: POLARIZATION AND CORROSION RATES; 5.1 Polarization; 5.2 The Polarized Cell; 5.3 How Polarization Is Measured; 5.3.1 Calculation of IR Drop in an Electrolyte; 5.4 Causes of Polarization; 5.5 Hydrogen Overpotential; 5.6 Polarization Diagrams of Corroding Metals; 5.7 Influence of Polarization on Corrosion Rate; 5.8 Calculation of Corrosion Rates from Polarization Data; 5.9 Anode-Cathode Area Ratio; 5.10 Electrochemical Impedance Spectroscopy; 5.11 Theory of Cathodic Protection; References; General References; Problems; Answers to Problems; 6 PASSIVITY; 6.1 Definition; 6.2 Characteristics of Passivation and the Flade Potential; 6.3 Behavior of Passivators; 6.3.1 Passivation of Iron by HNO₃; 6.4 Anodic Protection and Transpassivity; 6.5 Theories of Passivity; 6.5.1 More Stable Passive Films with Time; 6.5.2 Action of Chloride Ions and Passive-Active Cells; 6.6 Critical Pitting Potential; 6.7 Critical Pitting Temperature; 6.8 Passivity of Alloys; 6.8.1 Nickel-Copper Alloys; 6.8.2 Other Alloys; 6.9 Effect of Cathodic Polarization and Catalysis; References; General References; Problems; Answers to Problems; 7 IRON AND STEEL; 7.1 Introduction; 7.2 Aqueous Environments; 7.2.1 Effect of Dissolved Oxygen; 7.2.2 Effect of Temperature; 7.2.3 Effect of pH; 7.2.4 Effect of Galvanic Coupling; 7.2.5 Effect of Velocity on Corrosion in Natural Waters

Sommario/riassunto

This Fourth Edition presents an updated overview of the essential aspects of corrosion science and engineering that underpin the tools and technologies used for managing corrosion, enhancing reliability, and preventing failures. Select features of this new edition include: expanded discussions on electrochemical polarization, predicting corrosion using thermodynamics, steel reinforcements in concrete, and applications of corrosion control technologies in various industries; and a stronger emphasis on environmental concerns and regulations in the context of their impact on corrosion engi