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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
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5.4 Causes of Polarization5.5 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 Passivity6.5.1 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
