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3.10.3 Saturated Copper-Copper Sulfate Reference ElectrodeReferences; 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 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 HNO(3); 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