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1.6.5 Liquid Redox Batteries1.7 Light Fuel Generation and Storage: Water Electrolysis, Chloro-Alkaline Electrolysis, Photoelectrochemical and Photocatalytic H2 Generation, and Electroreduction of CO2; 1.7.1 Water Electrolysis; 1.7.2 Electrochemistry of Water Splitting; 1.7.3 Chlor-Alkaline Electrolysis; 1.7.4 Photoelectrochemical and Photocatalytic H2 Generation; 1.7.5 Carbon Dioxide Reduction; 1.8 Fuel Cells: Fundamentals to Systems (Phosphoric Acid Fuel Cells, PEM Fuel Cells, Direct Methanol Fuel Cells, Molten Carbon Fuel Cells, and Solid Oxide Fuel Cells); 1.8.1 Alkaline Fuel Cells
1.8.2 Direct Methanol Fuel Cells1.8.3 Phosphoric Acid Fuel Cells (PAFCs); 1.8.4 Proton Exchange Membrane Fuel Cells; 1.8.5 High-Temperature Molten Carbonate Fuel Cells; 1.8.6 Solid Oxide Fuel Cells; 1.9 Summary; Acknowledgments; References; Further Reading; 2 Electrochemical Engineering Fundamentals; 2.1 Electrical Current/Voltage, Faraday's Laws, Electric Efficiency, and Mass Balance; 2.1.1 Current Efficiency; 2.1.2 Mass Balance; 2.2 Electrode Potentials and Electrode-Electrolyte Interfaces; 2.2.1 Potential Difference; 2.2.2 Electrode-Electrolyte Interfaces
2.3 Electrode Kinetics (Charger Transfer (Butler-Volmer Equation) and Mass Transfer (Diffusion Laws))

Sommario/riassunto

In this handbook and ready reference, editors and authors from academia and industry share their in-depth knowledge of known and novel materials, devices and technologies with the reader. The result is a comprehensive overview of electrochemical energy and conversion methods, including batteries, fuel cells, supercapacitors, hydrogen generation and storage as well as solar energy conversion. Each chapter addresses electrochemical processes, materials, components, degradation mechanisms, device assembly and manufacturing, while also discussing the challenges and perspectives for each energy sto