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Titolo	Hydrogen production : by electrolysis / / edited by Agata Godula-Jopek ; with a foreword by Detlef Stolten ; contributors, Cyril Bourasseau [and six others]
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Nota di contenuto	Cover; Related Titles; Title Page; Copyright; Foreword; Preface; List of Contributors; Chapter 1: Introduction; 1.1 Overview on Different Hydrogen Production Means from a Technical Point of View; 1.2 Summary Including Hydrogen Production Cost Overview; References; Chapter 2: Fundamentals of Water Electrolysis; 2.1 Thermodynamics of the Water Splitting Reaction; 2.2 Efficiency of Electrochemical Water Splitting; 2.3 Kinetics of the Water Splitting Reaction; 2.4 Conclusions; References; Chapter 3: PEM Water Electrolysis; 3.1 Introduction, Historical Background 3.2 Concept of Solid Polymer Electrolyte Cell3.3 Description of Unit PEM Cells; 3.4 Electrochemical Performances of Unit PEM Cells; 3.5 Cell Stacking; 3.6 Balance of Plant; 3.7 Main Suppliers, Commercial Developments and Applications; 3.8 Limitations, Challenges and Perspectives; 3.9 Conclusions; References; Chapter 4: Alkaline Water Electrolysis; 4.1 Introduction and Historical Background; 4.2 Description of Unit Electrolysis Cells; 4.5 Conclusions; References;

Chapter 5: Unitized Regenerative Systems; 5.1 Introduction; 5.2 Underlying Concepts; 5.3 Low-Temperature PEM URFCs
5.4 High-Temperature URFCs5.5 General Conclusion and Perspectives; References; Chapter 6: High-Temperature Steam Electrolysis; 6.1 Introduction; 6.2 Overview of the Technology; 6.3 Fundamentals of Solid-State Electrochemistry in SOEC; 6.4 Performances and Durability; 6.5 Limitations and Challenges; 6.6 Specific Operation Modes; References; Chapter 7: Hydrogen Storage Options Including Constraints and Challenges; 7.1 Introduction; 7.2 Liquid Hydrogen; 7.3 Compressed Hydrogen; 7.4 Cryo-Compressed Hydrogen; 7.5 Solid-State Hydrogen Storage Including Materials and System-Related Problems
7.6 SummaryReferences; Chapter 8: Hydrogen: A Storage Means for Renewable Energies; 8.1 Introduction; 8.2 Hydrogen: A Storage Means for Renewable Energies (RE); 8.3 Electrolysis Powered by Intermittent Energy: Technical Challenges, Impact on Performances and Reliability; 8.4 Integration Schemes and Examples; 8.5 Techno-Economic Assessment; 8.6 The Role of Simulation for Economic Assessment; 8.7 Conclusion; References; Chapter 9: Outlook and Summary; 9.1 Comparison of Water Electrolysis Technologies; 9.2 Technology Development Status and Main Manufacturers
9.3 Material and System Roadmap SpecificationsReferences; Index; End User License Agreement

Sommario/riassunto

Covering the various aspects of this fast-evolving field, this comprehensive book includes the fundamentals and a comparison of current applications, while focusing on the latest, novel achievements and future directions. The introductory chapters explore the thermodynamic and electrochemical processes to better understand how electrolysis cells work, and how these can be combined to build large electrolysis modules. The book then goes on to discuss the electrolysis process and the characteristics, advantages, drawbacks, and challenges of the main existing electrolysis technologies. Current ma