

Contents

Preface — V

List of contributors — IX

Slimane Merouani, Aissa Dehane

Chapter 1

Hydrogen: A pathway to cleaner energy — 1

Henok Atile Kibret, Javad Vahabzadeh Pasikhani, Kazem Adavi, Jaber Shabanian,
Navid Mostoufi, Jamal Chaouki

Chapter 2

Novel thermal approaches for hydrogen production — 55

Slimane Merouani, Aissa Dehane, Oualid Hamdaoui

Chapter 3

**Hydrogen production from water electrolysis: Fundamentals, technologies,
progress, and challenges — 133**

Slimane Merouani, Aissa Dehane, Oualid Hamdaoui, Mustapha Chikhi

Chapter 4

**Emerging strategies for efficient low-temperature electrolysis for hydrogen
production — 201**

M. Carmen Herrera-Beurnio, Alejandro Ariza-Pérez,
Juan Martín-Gómez, Francisco Javier López-Tenllado,
Jesús Hidalgo-Carrillo, Alberto Marinas, Francisco José Urbano

Chapter 5

**Advances in hydrogen production by photocatalysis: efficiency
improvements and research for effective photocatalysts — 271**

Slimane Merouani, Aissa Dehane

Chapter 6

**From ultrasound waves to hydrogen: a comprehensive exploration of
sonochemical hydrogen production — 319**

VIII — Contents

Aissa Dehane, Slimane Merouani

Chapter 7

Methane/methanol sono-conversion for hydrogen production: experimental insights and comprehensive theoretical analysis — 353

Hamid Derdiche, Rania Zamouche Zerdazi, Ouafa Achouri, Meriem Boutraa, Ouidad Abdelaziz, Mahfoud Sakhraoui

Chapter 8

Biological hydrogen production — 381

Aissa Dehane, Slimane Merouani, Atef Chibani

Chapter 9

Progress and outlook in hydrogen storage technologies — 429

Aissa Dehane, Slimane Merouani, Oualid Hamdaoui

Chapter 10

Progress and outlook in hydrogen utilization — 485

Index — 511