

## **Hydrogen Economy**

P K Pahwa, G K Pahwa

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As the dependence on the depleting fossils fuels continues and global warming increases, we need to find an energy system that is renewable and sustainable, efficient and cost-effective, convenient and safe. Hydrogen has been proposed as the perfect fuel to sustain the energy system. The availability of a reliable and cost-effective supply, safe and efficient storage, and convenient end use of hydrogen will be essential for a transition to a hydrogen economy. Research is being conducted throughout the world for the development of safe, cost-effective hydrogen production, storage, and end-use technologies that support and foster this transition.

Hydrogen Economy discusses the strategies and roadmaps of introducing hydrogen as the alternate source of fuel for sustainable development. The book examines the link between development and energy, prospects of sustainable development, significance of hydrogen energy economy. It provides an authoritative and up-to-date scientific account of hydrogen generation, storage, transportation, and safety.

#### **Key Features:**

- Explains the significance of hydrogen economy
- Examines the feasibility of transporting, distributing and utilizing hydrogen
- Assesses the safety of using hydrogen and potential hazards

#### **Contents:**

Preface

#### 1. Energy and Development

- How Energy is Measured?
- Fossil Fuels
- Contribution of Non-fossil Energy Sources to Global Primary Energy Mix

#### 2. Significance of Hydrogen Economy

- Energy Crisis
- Environmental Effects of Using Fossil Fuels
- Energy and Environment
- Sustainable Development
- Transition to the Hydrogen Economy

#### 3. Hydrogen Production

#### 4. Hydrogen Storage

- Fundamentals of Hydrogen
- Hydrogen Embrittlement
- Introduction to Packaging and Storage of Hydrogen

- Standardization for Hydrogen Gas Cylinders
- ASME Code Symbol Stamp
- Hydrogen Liquefaction
- Liquid Hydrogen Storage
- Hydrogen Storage in Metal Hydrides
- Developing Hydrogen Storage Media
- On-board Hydrogen Storage
- Choice of Storage Method

#### 5. Transportation, Distribution, and Utilization of Hydrogen

- Transportation of Hydrogen
- Compressed Gas Transport
- Transfer of Hydrogen Gas

#### 6. Hydrogen Hazards Assessment and Safety

- Terms and Definitions
- Hazard Analysis
- Choosing a Methodology
- Hydrogen Hazards
- Mandated Requirements
- Hydrogen Safety

#### **Appendix**

- 1: Liquid Hydrogen Handler's Qualification Training
- 2: Scaling Laws, Explosions, Blast Effects, and Fragmentation
- 3: Hydrogen Sensing and Detection
- 4: Relief Devices

Bibliography

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About the Authors





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