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Nota di contenuto	1 Introduction -- 2 Hydrogen Production -- 2.1 Hydrogen from Fossil Raw Materials -- 2.2 Electrolytic Hydrogen Production -- 2.3 Thermochemical Water Decomposition Procedure -- 2.4 Further Procedures for Hydrogen Production from Water -- References -- 3 Hydrogen Liquefaction -- 3.1 Fundamental Principles of Hydrogen Liquefaction -- 3.2 Small and Medium Liquefaction Plants -- 3.3 Magnetocaloric Liquefiers -- 3.4 Large-scale Industrial Liquefaction Plants -- References -- 4 Thermal Insulation, Storage and Transportation of Liquid Hydrogen -- 4.1 Mechanisms of Heat Transfer and Insulation Techniques -- 4.2 Storage and Transportation of Liquid Hydrogen -- 4.3 Liquid Hydrogen Pipelines -- 4.4 Liquid Hydrogen Pumps -- References -- 5 Liquid Hydrogen as a Rocket Propellant -- 5.1 Chemical Rocket Propulsion -- 5.2 Nuclear Rocket Propulsion -- References -- 6 Liquid Hydrogen as Fuel -- 6.1 Air Transport -- 6.2 Ground Transport -- References -- 7 Outlook to Future Applications -- 7.1 Hydrogen as an Energy Carrier in the Future -- 7.2 Motor Vehicle

Applications -- 7.3 Rail Vehicle Applications -- 7.4 Applications in Water Transportation -- 7.5 Applications in Aviation and Space Flight -- 7.6 Liquid Hydrogen in Stationary Energy Technology -- 7.7 Future Prospects -- References -- 8 Safe Handling of Liquid Hydrogen -- 8.1 Materials for the Use of Liquid Hydrogen -- 8.2 Handling of Hydrogen as a Cryogenic Liquid -- 8.3 Hydrogen as Flammable Liquid -- References -- 9 Physical and Technical Data of Liquid Hydrogen.

Sommario/riassunto

to the German Edition This book is based on published material, oral presentations and lecture courses, as well as the author's personal research in the specific field of space technology and in the general areas of energy storage and transfer, and cryogenics. The science and technology of liquid hydrogen-once essential prere- quisites for the rapid development of space technology-are now also proving to be more and more important for the energy production of the future. Hydrogen as an energy carrier can generally mediate the existing disparity between nuclear energy and regenerative energy, both of which are indispensable for the future. Hydrogen, as a secondary energy carrier, can be produced from these primary energy sources with minimal environmental impact and without the detrimental, long-term pollution effects of current fossil fuel technology. Hydrogen, therefore, represents the ultimate in energy technology. The initial, large-scale application of hydrogen as a secondary energy was as a high-energy rocket propellant. The procedures for its large scale liquefaction, storage and employment were generally developed in the U.S. Currently in Europe similar activities are being conducted only in France. The effort in West Germany involves testing hydrogen-oxygen and hydrogen-fluorine rocket engines, studying also the physical and technical characteristics of slush hydrogen-mixture of the solid and liquid phase-and is concentrating currently on R&D applications of liquid hydrogen as an alternate fuel. Similar activities are also being conducted in Japan and Canada.