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Nota di contenuto	FUEL CELLS; CONTENTS; PREFACE; PREFACE TO THE FIRST EDITION; SYMBOLS; ABBREVIATIONS AND ACRONYMS; PART I INTRODUCTION; Introduction; What Is a Fuel Cell? Definition of the Term Significance of Fuel Cells for the Economy; 1 The Working Principles of a Fuel Cell; 1.1 Thermodynamic Aspects; 1.2 Schematic Layout of Fuel Cell Units; 1.3 Types of Fuel Cells; 1.4 Layout of a Real Fuel Cell: The Hydrogen-Oxygen Fuel Cell with Liquid Electrolyte; 1.5 Basic Parameters of Fuel Cells; Reference; 2 The Long History of Fuel Cells; 2.1 The Period Prior to 1894; 2.2 The Period from 1894 to 1960 2.3 The Period from 1960 to the 1990s 2.4 The Period After the 1990s; References; PART II MAJOR TYPES OF FUEL CELLS; 3 Proton-Exchange Membrane Fuel Cells; 3.1 History of the PEMFC; 3.2 Standard PEMFC Version from the 1990s; 3.3 Special Features of PEMFC Operation; 3.4 Platinum Catalyst Poisoning by Traces of CO in the Hydrogen; 3.5 Commercial Activities in Relation to PEMFCs; 3.6 Future Development of

PEMFCs; 3.7 Elevated-Temperature PEMFCs; References; 4 Direct Liquid Fuel Cells; Part A: Direct Methanol Fuel Cells; 4.1 Methanol as a Fuel for Fuel Cells
4.2 Current-Producing Reactions and Thermodynamic Parameters
4.3 Anodic Oxidation of Methanol; 4.4 Milestones in DMFC Development;
4.5 Membrane Penetration by Methanol (Methanol Crossover); 4.6 Varieties of DMFCs; 4.7 Special Operating Features of DMFCs; 4.8 Practical Models of DMFCs and Their Features; 4.9 Problems to Be Solved in Future DMFCs; Part B: Direct Liquid Fuel Cells; 4.10 The Problem of Replacing Methanol; 4.11 Fuel Cells Using Organic Liquids as Fuels; 4.12 Fuel Cells Using Inorganic Liquids as Fuels; References; 5 Phosphoric Acid Fuel Cells
5.1 Early Work on Phosphoric Acid Fuel Cells
5.2 Special Features of Aqueous Phosphoric Acid Solutions; 5.3 Construction of PAFCs; 5.4 Commercial Production of PAFCs; 5.5 Development of Large Stationary Power Plants; 5.6 The Future of PAFCs; 5.7 Importance of PAFCs for Fuel Cell Development; References; 6 Alkaline Fuel Cells; 6.1 Hydrogen-Oxygen AFCs; 6.2 Alkaline Hydrazine Fuel Cells; 6.3 Anion-Exchange (Hydroxyl Ion-Conducting) Membranes; 6.4 Methanol Fuel Cells with Anion-Exchange Membranes; 6.5 Methanol Fuel Cell with an Invariant Alkaline Electrolyte
6.6 Direct Ammonia Fuel Cell with an Anion-Exchange Membrane
References; 7 Molten Carbonate Fuel Cells; 7.1 Special Features of High-Temperature Fuel Cells; 7.2 Structure of Hydrogen-Oxygen MCFCs; 7.3 MCFCs with Internal Fuel Reforming; 7.4 Development of MCFC Work; 7.5 The Lifetime of MCFCs; References; 8 Solid-Oxide Fuel Cells; 8.1 Schematic Design of Conventional SOFCs; 8.2 Tubular SOFCs; 8.3 Planar SOFCs; 8.4 Monolithic SOFCs; 8.5 Varieties of SOFCs; 8.6 Utilization of Natural Fuels in SOFCs; 8.7 Interim-Temperature SOFCs; 8.8 Low-Temperature SOFCs
8.9 Factors Influencing the Lifetime of SOFCs

Sommario/riassunto

"This book extracts the most important information on fuel cells, analyzes it, and assesses its scientific value and technical importance. It provides a full yet concise description of all the important aspects of fuel cells from major types to their historical development to inherent scientific and engineering problems and their commercialization and applications. This edition adds two new chapters, one on structural and wetting properties of porous fuel cell components and the other on fuel cells with mixed reactant supply, and updates all chapters with current knowledge for each topic"--
