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8.3.1.2 Nonperfluorinated Membranes -- 8.3.2 Anionexchange Membranes (AEMs) -- 8.3.2.1 Functionalized Polyketones -- 8.3.2.2 Poly(Vinyl Benzyl Trimethyl Ammonium) (PVBTMA) Polymers -- 8.3.2.3 Poly(sulfones) (PS) -- 8.3.3 Hybrid Ionexchange Membranes -- 8.3.3.1 Hybrid Membranes with Single Ceramic Oxoclusters [P/(MxOy)n] -- 8.3.3.2 Hybrid Membranes Comprising Surfacefunctionalized Nanofillers -- 8.3.3.3 Hybrid Membranes Doped with hierarchical "Core-Shell" Nanofillers -- 8.3.4 Porous Membranes -- 8.3.4.1 Porous Membranes as Host Material -- 8.3.4.2 Porous Membranes as Support Layer -- 8.3.4.3 Porous Membranes as Unconventional Separators -- 8.4 Mechanism of Ion Conduction -- 8.5 Summary and Perspectives -- Acronyms -- Symbols -- References -- Chapter 9 Supports for Oxygen Reduction Catalysts: Understanding and Improving Structure, Stability, and Activity -- 9.1 Introduction -- 9.2 Carbon Black Supports -- 9.3 Decoration and Modification with Metal Oxide Nanostructures -- 9.4 Carbon Nanotube as Carriers -- 9.5 Doping, Modification, and Other Carbon Supports -- 9.6 Graphene as Catalytic Component -- 9.7 Metal Oxidecontaining ORR Catalysts -- 9.8 Photodeposition of Pt on Various Oxide-Carbon Composites -- 9.9 Other Supports -- 9.10 Alkaline Medium -- 9.11 Toward More Complex Hybrid Systems -- 9.12 Stabilization Approaches -- 9.13 Conclusions and Perspectives -- Acknowledgment -- References -- Part IV Physical-Chemical Characterization -- Chapter 10 Understanding the Electrocatalytic Reaction in the Fuel Cell by Tracking the Dynamics of the Catalyst by X ray Absorption Spectroscopy -- 10.1 Introduction -- 10.2 A Short Introduction to XAS -- 10.3 Application of XAS in Electrocatalysis -- 10.3.1 Ex Situ Characterization of Electrocatalyst -- 10.3.2 Operando XAS Studies -- 10.4 XANES Analysis to Track Adsorbate.
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Sommario/riassunto

This book, edited by Nicolas Alonso-Vante and Vito Di Noto, provides a comprehensive exploration of membrane fuel cells, focusing on the methods, modeling, and applications of this technology. It delves into system-level constraints, fuel cell design, and the fundamental principles underpinning the operation of polymer electrolyte membrane (PEM) fuel cells. The book discusses the kinetics of fuel cell reactions, the role of catalysts, and the durability and performance assessment of fuel cells. It also explores recent advances in hydrogen oxidation reactions and the development of PGM-free catalysts. Intended for researchers and professionals in the field, this resource aims to support the development of clean and sustainable energy technologies.