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Nota di contenuto	Front cover; PEM Fuel Cell Modeling and Simulation Using MATLAB®; Copyright page; Table of contents; Acknowledgments; CHAPTER 1: An Introduction to Fuel Cells; 1.1 Introduction; 1.2 What Is a Fuel Cell?; 1.3 Why Do We Need Fuel Cells?; 1.4 History of Fuel Cells; 1.5 Mathematical Models in the Literature; 1.6 Creating Mathematical Models; Chapter Summary; Problems; Bibliography; CHAPTER 2: Fuel Cell Thermodynamics; 2.1 Introduction; 2.2 Enthalpy; 2.3 Specific Heats; 2.4 Entropy; 2.5 Free Energy Change of a Chemical Reaction; 2.6 Fuel Cell Reversible and Net Output Voltage 2.7 Theoretical Fuel Cell EfficiencyChapter Summary; Problems; Bibliography; CHAPTER 3: Fuel Cell Electrochemistry; 3.1 Introduction; 3.2 Basic Electrokinetics Concepts; 3.3 Charge Transfer; 3.4 Activation Polarization for Charge Transfer Reactions; 3.5 Electrode Kinetics; 3.6 Voltage Losses; 3.7 Internal Currents and Crossover Currents; Chapter Summary; Problems; Bibliography; CHAPTER 4: Fuel Cell Charge Transport; 4.1 Introduction; 4.2 Voltage Loss Due to Charge Transport; 4.3 Electron Conductivity of Metals; 4.4 Ionic Conductivity of Polymer

Electrolytes; Chapter Summary; Problems

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7.2 Physical Description of the Proton Exchange Membrane  
7.3 Types of Models; 7.4 Proton Exchange Membrane Modeling Example; Chapter Summary; Problems; Bibliography;  
CHAPTER 8: Modeling the Gas Diffusion Layers; 8.1 Introduction; 8.2 Physical Description of the Gas Diffusion Layer; 8.3 Basics of Modeling Porous Media; 8.4 Modes of Transport in Porous Media; 8.5 Types of Models; 8.6 GDL Modeling Example; Chapter Summary; Problems; Bibliography;  
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11.6 Capillary Effects

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## Sommario/riassunto

Although, the basic concept of a fuel cell is quite simple, creating new designs and optimizing their performance takes serious work and a mastery of several technical areas. PEM Fuel Cell Modeling and Simulation Using Matlab, provides design engineers and researchers with a valuable tool for understanding and overcoming barriers to designing and building the next generation of PEM Fuel Cells. With this book, engineers can test components and verify designs in the development phase, saving both time and money. Easy to read and understand, this book provides design and modelling tips for

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