



# PEM Fuel Cells, Second Edition: Theory and Practice

By Frano Barbir



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**PEM Fuel Cells, Second Edition: Theory and Practice** By Frano Barbir



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Demand for fuel cell technology is growing rapidly. Fuel cells are being commercialized to provide power to buildings like hospitals and schools, to replace batteries in portable electronic devices, and as replacements for internal combustion engines in vehicles. PEM (Proton Exchange Membrane) fuel cells are lighter, smaller, and more efficient than other types of fuel cell. As a result, over 80% of fuel cells being produced today are PEM cells.

This new edition of Dr. Barbir's groundbreaking book still lays the groundwork for engineers, technicians and students better than any other resource, covering fundamentals of design, electrochemistry, heat and mass transport, as well as providing the context of system design and applications. Yet it now also provides invaluable information on the latest advances in modeling, diagnostics, materials, and components, along with an updated chapter on the evolving applications areas wherein PEM cells are being deployed.

- Comprehensive guide covers all aspects of PEM fuel cells, from theory and fundamentals to practical applications
- Provides solutions to heat and water management problems engineers must face when designing and implementing PEM fuel cells in systems
- Hundreds of original illustrations, real-life engineering examples, and end-of-chapter problems help clarify, contextualize, and aid understanding



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## **Editorial Review**

### **Review**

"Of the numerous books on fuel cells I have seen come through our lab in the past few years, I find this one the most useful...I'm already planning to incorporate many items I have gleaned from this book into my public and classroom presentations on hydrogen energy." – *Hydrogen & Fuel Cell Letter, September 2005*  
*PEM Fuel Cells* "are the primary candidates for light-duty vehicles, for buildings, and potentially for much smaller applications such as replacements for rechargeable batteries in video cameras." – *United States Department of Energy*

### **From the Back Cover**

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- First authoritative book on theory and practice of PEM fuel cells
- Contains hundreds of original illustrations and real-life engineering examples
- Practical teaching tool for engineering students.

Demand for alternative energy sources is on the rise and fuel cells are pulling ahead as the leading technology. Proton Exchange Membrane (PEM) fuel cells in particular are experiencing an upsurge because of their high power density and ability to vary output quickly to meet shifts in power demand. Until now, there has been little written about this important technology. *PEM Fuel Cells: Theory and Practice* lays the groundwork for fuel cell engineers, technicians and students. Through the use of real life examples on the various aspects of fuel cell engineering, this book covers the fundamental aspects of fuel cell design, electrochemistry of the technology, heat and mass transport, system design and applications. From fuel cell performance to sizing the system components, this is the most comprehensive teaching tool available.

## **Users Review**

### **From reader reviews:**

#### **Lorraine Prinz:**

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**Timothy Hawkins:**

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