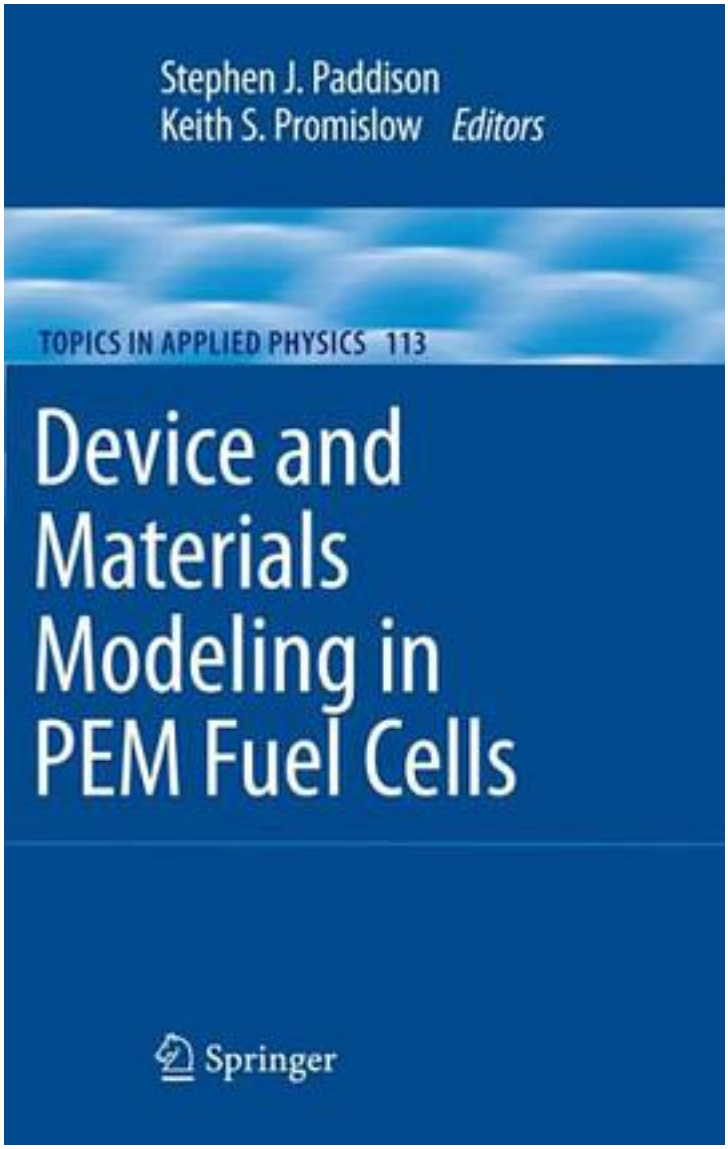
Device and Materials Modeling in PEM Fuel Cells



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The impact of proton exchange membrane (PEM) fuel cells on energy generation will parallel the impact of the integrated circuit on information technology. The underlying processes in PEM fuel cells have strong ties to energy generation at the mitochondrial level in organic life. The potential applications range from the micron scale to large scale industrial production. Successful integrated of PEM fuel cells into the mass-market will require new materials and a deepening understanding of the balance required to maintain the various operational states. Key areas of development include electrocatalysts for the fuel and air electrodes and membranes exhibiting good proton conductivity under minimal hydration and temperatures between -20 C to 120 C. New materials possessing improved properties will emerge as a result of a collaborative effort between experimentalists, engineers, and theorists, the latter doing both device and materials modeling. This book presents a series of contributed articles from scientists who have made a contribution in the modeling of fuel cells from either a device or materials perspective. As fuel cell technologies are an emerging area this book will be of interest to any working in this field. This book will provide a survey (with significant depth) of virtually all the computational and modeling work done in this area.

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