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Editorial

Hydrogen-Based Energy Conversion: Polymer Electrolyte Fuel Cells and Electrolysis

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This book [1] comprises the following four sections: (i) the first section is related to the Polymeric Electrolyte Membranes [2–4]; (ii) the second section, the Gas Diffusion Layers [5,6]; (iii) the third section, the Membrane–Electrode Assembly [7,8]; (iv) the fourth section, the Numerical Simulation and/or Experimental Study of Flow Field [9,10] for polymer electrolyte fuel cell (PEFC) and/or polymer electrolyte water electrolysis (PEWE). A polymer electrolyte could be a proton exchange membrane or an anion exchange membrane. The topic of each section is outlined as follows.

1. Polymer Electrolyte Membranes
   - A. Proton exchange composite membranes using hydrophilized porous substrates [2].
   - B. KOH-doped polybenzimidazole membranes with asymmetrical pore distribution [3].
   - C. Pore-filled anion exchange membranes with double cross-linking [4].
2. Gas Diffusion Layers
   - A. Optimization of the preparation method of perfluoropolyether-based gas diffusion media [5].
   - B. Semi-empirical model to predict the electrical conductivity of gas diffusion layers using sintered metal fibers [6].
3. Membrane–Electrode Assembly
   - A. Innovative preparation method of membrane–electrode assemblies for proton exchange membrane water electrolysis [7].
   - B. Effect of dispersion solvents in catalyst inks on the performance and durability of catalyst layers for proton exchange membrane fuel cells [8].
4. Numerical Simulation and/or Experimental Study of Flow Field
   - A. Experimental studies of the effect of land width of serpentine follow field in proton exchange membrane fuel cells [9].
   - B. Study on liquid water transport in porous metal foam flow-field using a two-phase numerical modelling and an ex situ experimental study in proton exchange membrane fuel cells [10].

All the sections cover the recent studies on the main components of PEFC's or PEWE's stack. The studies provide the underlying material, electrochemical and/or mechanical aspects that improve the mass transport of gas, ions (liquid) and electrons for the PEFC's or PEWE's electrochemical reactions at the triple-phase boundary in electrodes. Each study offers the fundamentals and comprehensive background and the clear-edge technology on the aforementioned materials and mass transport phenomena.

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