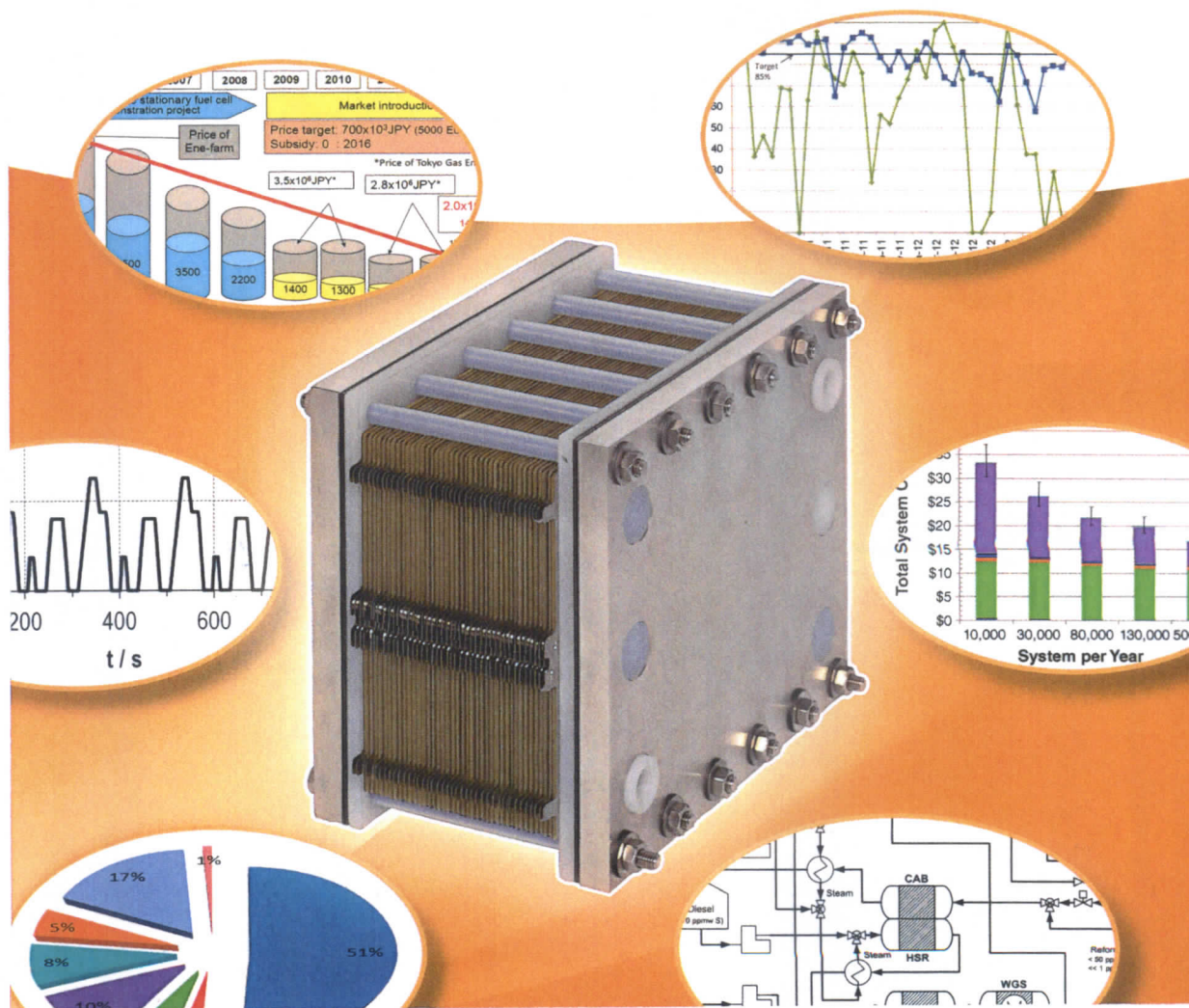


Edited by Detlef Stolten, R. Can Samsun,
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Fuel Cells

Data, Facts, and Figures



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14 Single Cell for Proton Exchange Membrane Fuel Cells (PEMFCs)

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Abstract

The evaluation of single cell performance of a proton exchange membrane fuel cell (PEMFC) is mandatory for the development of single cell components such as the membrane electrode assembly (MEA), gas diffusion medium (GDM), and bipolar plate. This chapter describes the cell components that comprise a PEMFC single cell, and explains their roles in the assembled cell.

Keywords: bipolar plate; end plate; gas diffusion medium; gasket; insulator; medium; membrane electrode assembly; proton exchange membrane fuel cell; single cell

14.1

Introduction

The amount of electricity generated in a single cell of a PEMFC is very limited. To obtain increased energy output, a PEMFC stack in which single cells are arranged in series or a row should be a practical configuration for producing the desired amounts of electricity on a commercially useful basis. However, the stack arrangement is not appropriate for evaluating the components of PEMFCs, especially because of their complexity and expensive manufacturing process. It is, though, quite practical and simple to manufacture and evaluate the performance of the materials and parts comprising a single cell component of the stack, rather than assess the stack after assembly. Moreover, the results of the single cell performance tests are reliable and can be acquired very cheaply. The main components of a single PEMFC and their functions are discussed in this chapter.