

Thermodynamic Analysis of Performance of PEM Fuel Cell System in Simple And CHP Modes

Gh.R. Ashari, S. Shalbaf, A. Imanzadeh, A. Baheri

Baheri_2003@yahoo.com, Reza.ashnava@yahoo.com, saman.shalbaf@gmail.com, imanzadeh@gmail.com

Abstract:

In this paper, energy and exergy analysis of fuel cell systems has been considered in simple and CHP modes. System model consists of following components: fuel cell stacks, burner, reformer, heat exchanger, battery and water heater. Thermodynamic analysis of system has been investigated with consideration of variations of energy efficiency, exergy efficiency and entropy generation versus internal air temperature to the fuel cell for different air stoichiometries. Results show that by increasing of internal air temperature to the fuel cell, entropy generation and exergy efficiency increase in both simple and CHP modes. Also, in simple mode, not in CHP mode, increasing of internal air temperature leads to decreasing of energy efficiency.

Keywords: Simple system, CHP system, Entropy generation, Energy and exergy efficiencies, Air stoichiometry, internal air temperature.