

عنوان مقاله:

Thermodynamic and Exergy Analysis of Cogeneration Cycles of Electricity and Heat Integrated with a Solid Oxide Fuel Cell Unit

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خلاصه مقاله:

Among the items that have been widely used as a solution to reduce energy consumption and air pollution are cycles of simultaneous generation of electricity and heat or CHP. In such cycles, the gas turbine's exhaust gases enter the steam production unit to produce the required steam or hot water. In the meantime, and due to the increasing use of oxidized fuel cells, combined circuits including fuel cells, gas turbines, and recovery boilers have been considered. In this paper, the combined cycle, including fuel, gas turbine, and recovery boiler, was thermodynamically analyzed, and its performance results are compared with a normal CHP cycle. Electrochemical and chemical modeling of fuel cells and exergy and thermodynamic analysis of all cycle components have been performed. In the cycle, performance changes with basic cycle parameters such as the temperature of the combustion products entering the gas turbine, the boiler steam pressure, the pinch point, the flow intensity, and the fuel cell stack temperature were analyzed. According to the results, the efficiency of the combined cycle with a fuel cell, is much higher, ۶۱% compared with the ۵۰% of the normal CHP.

کلمات کلیدی:

SOFC, cogeneration, CHP, Exergy analysis

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