

## عنوان مقاله:

Thermodynamic Simulation of a Solid Oxide Fuel Cell Integrated Gas Turbine Cycle Base on Irreversibility Analysis

## محل انتشار:

سومین کنفرانس ملی صنعت نیروگاههای حرارتی (سال: 1390)

تعداد صفحات اصل مقاله: 6

## نویسندگان:

,Babak Kamkari - *University of Tehran*

Abbas Aliabadi - *MAPNA Group*

Alireza Yazdizadeh

Alireza Taklifi - *MAPNA Group*

## خلاصه مقاله:

This study examines the performance of a hightemperature solid oxide fuel cell combined with a conventional recuperative gas turbine (GT–SOFC) plant, as well as theirreversibility within the system. Individual models are developed for each component, based on the first and second laws of thermodynamics. The overall system performance is then analyzed by applying thermodynamic laws for the entire cycle, to evaluate the thermal efficiency and entropy production of the plant. The results ofan assessment of the cycle for certain operating conditions are compared with conventional cycles. Further outcomes indicate thatincreasing the turbine inlet temperature results in decreasing the thermal efficiency of the cycle, whereas it improves the net specificpower output. Moreover, an increase in either the turbine inlet temperature or compression ratio leads to a higher rate of entropygeneration within the plant. It was found that about 58% of the irreversibility takes place in the combustor and SOFC at typical operating condition: 35% in the combustor and 23% in the SOFC. A comparison between the GT–SOFC plant and a traditional GT cycle, by identical operating conditions, is made. Although the irreversibility of a modern plant is higher than that of a conventional cycle, the superior performance of a GT–SOFC over a traditionalGT cycle is evident. It has about 28% higher efficiency than a traditional GT plant. In this case, the thermal efficiency of the integrated cycle becomes as high as 61% at the optimum compression ratio

## کلمات کلیدی:

SOFC, Power turbine, irreversibility, Thermodynamic

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/156291>

