عنوان مقاله:

Thermodynamic and exergoeconomic evaluation of waste heat recovery for hydrogen production in a CCHP system

محل انتشار:

فصلنامه هیدروژن و پیل سوختی ایران, دوره 9, شماره 1 (سال: 1401)

تعداد صفحات اصل مقاله: 16

نویسنده:

Armin Emamifar* - *Mechanical Engineering Department, Ayatollah Boroujerdi University, Boroujerd, Iran*

خلاصه مقاله:

This study presents the energy, exergy, and economic evaluation of recovering energy from a modified Kalina power-cooling system to provide heating and hydrogen. An ORC is employed to use the waste heat of the Kalina cycle, and the generated power is transmitted to a PEM electrolyzer for hydrogen production. Furthermore, the waste heat of the separator outlet is recovered through a new heat exchanger to provide heating. The results show that the proposed system can produce ۳۱۷ kW power, ۷۱۴.۷ kW cooling, ۵۰.۳ kW heating, and ۴.۴۹۱ kg/h hydrogen. Moreover, the exergoeconomic analysis indicates that the PEM electrolyzer, the cascade heat exchanger, and the vapor generator have the highest cost rate among the system components. Additionally, a parametric study was performed on the system to investigate the variation of some key parameters, including the maximum operating pressure, separator II pressure, ammonia mass fraction in a basic solution, and pinch point temperature difference in the cascade heat .exchanger for the thermodynamic and economic performance of the system

کلمات کلیدی:

Kalina cycle, PEM electrolyzer, multigeneration, exergoeconomic analysis