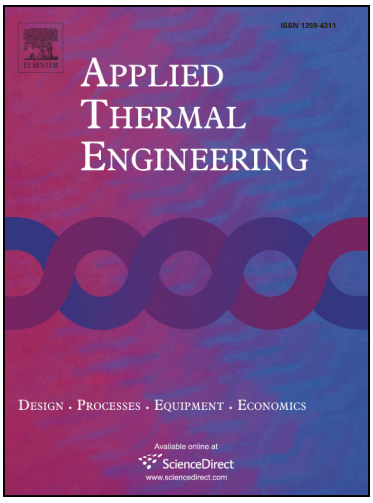

Research Paper

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Thermodynamic and thermoeconomic analysis of a novel combined cooling and power (CCP) cycle

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Highlights

- A novel combined cooling and power (CCP) cycle is presented.
- Energy, exergy, and exergoeconomic analysis of the proposed cycle are carried out.
- Parametric study of some key parameters of the presented system is performed.

Abstract

A new combined cooling and power (CCP) cycle is proposed by a novel combination of the Kalina cycle (KC) and ejector refrigeration cycle (ERC) to produce simultaneous power output and cooling output. The exhaust of the turbine is fed to the ejector as a primary flow to draw the secondary flow (outlet of the evaporator) into the ejector. Energy, exergy, and exergoeconomic analysis of the proposed cycle are carried out leading to determination of the first-law-efficiency, the second-law-efficiency, the sum unit cost of the product (SUCP) of the system, and the main source of the irreversibility. The thermal efficiency, exergy efficiency, overall exergy destruction rate, SUCP of the system, net produced power, and cooling capacity of the cycle are calculated 33.65 %, 10.78 %, 348.4 kW, 256.1 $/GJ, 33.65 kW, and 160.6 kW, respectively. Moreover, the

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