

## Accepted Manuscript

Thermodynamic analyses of the solar-driven Kalina cycle having a variable concentration ratio

Hui Hong, Jianjian Gao, Wanjun Qu, Jie Sun

PII: S1359-4311(17)32441-9

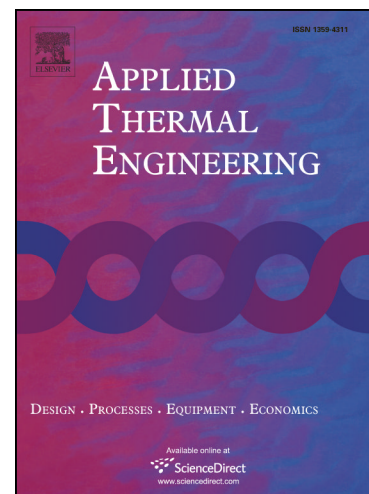
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2017.07.160>

Reference: ATE 10828

To appear in: *Applied Thermal Engineering*

Received Date: 11 April 2017

Accepted Date: 19 July 2017



Please cite this article as: H. Hong, J. Gao, W. Qu, J. Sun, Thermodynamic analyses of the solar-driven Kalina cycle having a variable concentration ratio, *Applied Thermal Engineering* (2017), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2017.07.160>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Thermodynamic analyses of the solar-driven Kalina cycle having a variable concentration ratio

Hui Hong<sup>a, 1</sup>, Jianjian Gao<sup>a, b</sup>, Wanjun Qu<sup>a, b</sup>, Jie Sun<sup>a</sup>

<sup>a</sup> Institute of Engineering Thermophysics, Chinese Academy of Sciences, Beijing 100190, China

<sup>b</sup> University of Chinese Academy of Sciences, Beijing 100049, China

- The middle-temperature solar-driven Kalina cycle was investigated
- The parabolic trough collector has a variable concentration ratio
- Kalina cycle basically operates at design points with varying solar irradiance
- Cycle can efficiently utilize a border range of direct normal irradiance to power
- Operation method for off-design conditions improves the annual efficiency

## Abstract

Solar thermal power generation is currently an attractive solar electricity technology. Currently, we face an important issue of lower annual solar-to-power efficiency (approximately 10.0%) using parabolic trough technology because the direct normal irradiance instantly varies, and the solar thermal power cycle always deviates from the designed operation. Here, we investigate a middle-temperature solar-driven Kalina cycle that uses a parabolic trough collector with a variable concentration ratio. From lower to higher direct normal irradiance, both the aperture area of collector and the flow process of the Kalina cycle can be changed. As a result, a much border direct normal irradiance of 100-1000 W/m<sup>2</sup> achieves a solar-to-power efficiency of 4~20%, resulting in an annual solar-to-power efficiency of approximately 14%. Furthermore, the interactions are analyzed among direct normal irradiance, the aperture area of the collector, and the flow process of the thermal cycle. An operation method for off-design conditions is proposed to greatly improve the annual solar-to-power efficiency, offering a pathway to efficiently utilize a border range of direct

---

<sup>1</sup> Corresponding author, Phone: +86-010-82543158; E-mail: honghui@iet.cn

متن کامل مقاله

دریافت فوری ←

**ISI**Articles

مرجع مقالات تخصصی ایران

- ✓ امکان دانلود نسخه تمام متن مقالات انگلیسی
- ✓ امکان دانلود نسخه ترجمه شده مقالات
- ✓ پذیرش سفارش ترجمه تخصصی
- ✓ امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
- ✓ امکان دانلود رایگان ۲ صفحه اول هر مقاله
- ✓ امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
- ✓ دانلود فوری مقاله پس از پرداخت آنلاین
- ✓ پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات