

Accepted Manuscript

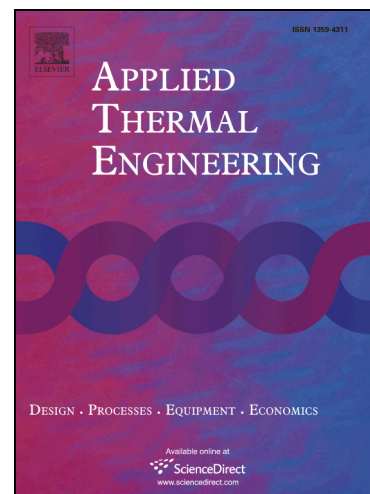
A Review of High-Temperature Particle Receivers for Concentrating Solar Power

Clifford K. Ho

PII: S1359-4311(16)30591-9
DOI: <http://dx.doi.org/10.1016/j.applthermaleng.2016.04.103>
Reference: ATE 8151

To appear in: *Applied Thermal Engineering*

Received Date: 7 March 2016
Revised Date: 17 April 2016
Accepted Date: 21 April 2016



Please cite this article as: C.K. Ho, A Review of High-Temperature Particle Receivers for Concentrating Solar Power, *Applied Thermal Engineering* (2016), doi: <http://dx.doi.org/10.1016/j.applthermaleng.2016.04.103>

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.

A Review of High-Temperature Particle Receivers for Concentrating Solar Power

Clifford K. Ho
Sandia National Laboratories
February 2016

Abstract

High-temperature particle receivers can increase the operating temperature of concentrating solar power (CSP) systems, improving solar-to-electric efficiency and lowering costs. Unlike conventional receivers that employ fluid flowing through tubular receivers, falling particle receivers use solid particles that are heated directly as they fall through a beam of concentrated sunlight, with particle temperatures capable of reaching 1000 °C and higher. Once heated, the hot particles may be stored and used to generate electricity in a power cycle or to create process heat. Because the solar energy is directly absorbed by the particles, the flux and temperature limitations associated with tubular central receivers are mitigated, allowing for greater concentration ratios and thermal efficiencies. Alternative particle receiver designs include free-falling, obstructed flow, centrifugal, flow in tubes with or without fluidization, multi-pass recirculation, north- or south-facing, and face-down configurations. This paper provides a review of these alternative designs, along with benefits, technical challenges, and costs.

1. Introduction

Higher efficiency power cycles are being pursued to reduce the levelized cost of energy from concentrating solar power tower technologies [1]. These cycles, which include combined

Download English Version:

<https://daneshyari.com/en/article/4992214>

Download Persian Version:

<https://daneshyari.com/article/4992214>

[Daneshyari.com](https://daneshyari.com)