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Modeling and Optimization of a High Temperature Solar Reactor

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Book Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller | Insight into Research and Modeling in Concentrating Solar Technology | A solar reactor consisting of a cavity-receiver containing an array of tubular absorbers is considered for the high temperature step of the zinc/zinc oxide thermochemical redox cycle using concentrated solar energy. The reactor is dimensioned, analyzed and optimized with the aim of maximizing efficiency and reaction conversion. 2D and 3D simulations of an 8kW reactor are implemented. Temperature distribution, reaction efficiency, tube efficiency and reaction conversion are analyzed to find the most promising reactor design. Additionally, basic knowledge in state of the art concentrating solar technology, design of experiments, radiative heat transfer, Mie theory, diffusion, reaction kinetics and in how to approach modeling tasks is given. The results of the optimization study show that the most significant factors are the concentration of the solar incoming radiation, the zinc oxide mass flow, the number of absorber tubes and their dimensions. | Format: Paperback | Language/Sprache: english | 100 pp.



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