



Modeling and Optimization of a High Temperature Solar Reactor

By Haussener, Sophia

Book Condition: New. Publisher/Verlag: VDM Verlag Dr. Müller Insight into Research and Modeling in Concentrating Solar Technology | A solar reactor consisting of a cavityreceivercontaining an array of tubular absorbers is considered for the high temperature step of thezinc/zinc oxide thermochemical redox cycle using concentrated solar energy. The reactor is dimensioned, analyzed and optimized with the aim of maximizing efficiency and reactionconversion. 2D and 3D simulations of an 8kW reactor areimplemented. Temperature distribution, reactionefficiency, tube efficiency and reaction conversionare analyzed to find the most promising reactor design. Additionally, basic knowledge in state of the artconcentrating solar technology, design of experiments, radiative heat transfer, Mie theory, diffusion, reaction kinetics and in how to approachmodeling tasks is given. The results of the optimization study show that themost 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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