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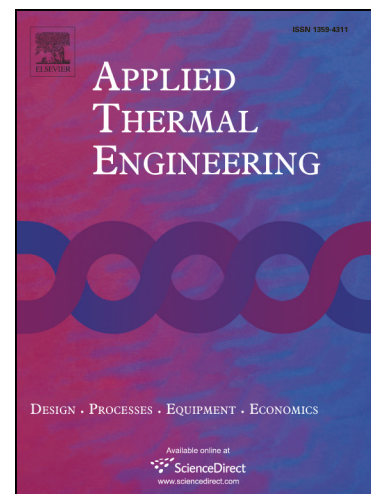
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A novel heat transfer model of a phase change material using in solar power plant

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Abstract: Concentrating solar power (CSP) plant coupling with thermal energy storage is a popular technology in the recent years. The storage technology is the wave of the future in solar utilization field. A lot of scholars focus on studying of heat transfer performance by the experimental or simulating method. In this paper, a novel heat transfer model of three-dimensional unsteady state heat conduction in cylindrical coordinate has been proposed based on the theoretical analysis. The most difficulty problem during the solution is the materials, which is molten salt based on some real cases, that is a phase change material (PCM) with the melting point of 494 K. The computer code of this model is written by C language in MATLAB software. The results show that the charge time is 25200 s (about 7 hours). Also, the characteristic of melting progress of the PCM has been obtained based on this program. The aim of this paper is to develop a new heat transfer model and provide a good reference to utilize solar energy.

Keywords: Concentrating solar power plant; Mathematical model of heat transfer; three-dimensional unsteady state; Cylindrical coordinate.

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