

Experimental and numerical study on melting of solar salt in a finned metallic container

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Publication date

2018/11/9

Conference

ASME International Mechanical Engineering Congress and Exposition

Volume

52088

Publisher

American Society of Mechanical Engineers

Abstract

This work presents an experimental and numerical study of the melting and solidification processes of Solar Salt in a finned square metallic container with a constant heat flux source inside for the latent heat thermal energy storage (LHTES) for medium temperature applications. During the experiments the temperature of the PCM in several locations were recorded and used to validate results of numerical simulations that were conducted deploying the enthalpy method in Ansys FLUENT. Two prototypes of the container were tested, one with fins made of steel and the other with fins and casing made of aluminum, to compare the charging and discharging time in both configurations. The modelling results are in good agreement with experimental data for the charging of aluminum container and slightly higher deviation are found in the other cases. The validated simulation model can be used as a design tool to achieve the optimal geometry of the full scale LHTES for the required charging and discharging periods.