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**Three-dimensional Numerical and Experimental Investigation
of the Behavior of Solar Salts within Thermal
Storage Devices during Phase Change**

Abbreviated Title: “Phase Change and Flow Behavior of Solar Salts in TSDs”

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ABSTRACT

Experiments and three-dimensional computational simulations of melting and solidifying solar salts in an aluminum container are performed in order to obtain a fuller picture of the thermal and flow behavior of this commonly-used phase change material. A heating element is placed under a closed aluminum container filled with solar salts, both with and without aluminum fins. Accurate simulations are performed in part by identifying thermal properties that lead to the accurate reproduction of experimental results; the thermal properties of the solar salts are found to differ significantly from values in the literature. The numerical results are then used to describe the dynamics of the solid-liquid front and flow patterns within the container during melting and solidification. The combined experimental and computational results provide insight

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