

Abstract Submitted
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In-Depth Absorption of Thermal Radiation in Phase Change Materials¹ LAURA PERSHERN, St. Cloud State University, MORGAN MINTON, JOHN BAKER, University of Alabama — Performance of a direct absorption solar thermal collector employing a phase change material (PCM) will be directly impacted by the radiant properties of the PCM. Melting and solidification behavior of paraffin, a commonly used PCM, exposed to an external thermal radiation field was investigated. As radiant properties of paraffin are different with respect to solid and liquid phases, the absorption of thermal radiation within the paraffin will be different in the two phases. It is hypothesized that this fact will change the melting and solidification behavior of the paraffin. The solid-liquid interfacial position was recorded as a function of time for heating from above for varying incident radiant intensities. When observed, flow structure was recorded. A one-dimensional heat transfer model was used to gain insight into the temperature behavior with the solid phase.

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