

Abstract Submitted  
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**Internal Phase Change Measurement Using Novel Luminescent Sensor**<sup>1</sup> JOSEPH GONZALES, TATSUNORI HAYASHI, HIROTAKA SAKAUE, University of Notre Dame — Numerous measurement techniques exist for measuring surface and bulk properties, but there are virtually no tools for spatially resolved internal measurements for a solid. A novel measurement technique was developed using the same luminophore technology used in temperature sensitive paints (TSPs). Particles of Acid Rhodamine B, a pH-sensitive luminophore, were embedded within an ice block and excited with UV light. Calibration tests demonstrated the luminescent peak and intensity of Acid Rhodamine B are functions of the phase, solid or liquid, of the water in which it is dissolved. Measurements of this luminescence provides a way to visualize fracture patterns and collect phase change information within ice. A high-speed camera was used to collect spatially and temporally resolved measurements of the internal properties of an ice block during melting. Additionally, tests were conducted to measure fracture behavior and phase changes produced by impacting an ice block at low speeds.

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