

Abstract Submitted  
for the DFD12 Meeting of  
The American Physical Society

**Global Temperature Measurement of Supercooled Water under Icing Conditions using Two-Color Luminescent Images and Multi-Band Filter** MIO TANAKA, Kanagawa Institute of Technology, KATSUAKI MORITA, The University of Tokyo, SHIGEO KIMURA, Kanagawa Institute of Technology, HIROTAKA SAKAUE, JAXA — Icing occurs by a collision of a supercooled-water droplet on a surface. It can be seen in any cold area. A great attention is paid in an aircraft icing. To understand the icing process on an aircraft, it is necessary to give the temperature information of the supercooled water. A conventional technique, such as a thermocouple, is not valid, because it becomes a collision surface that accumulates ice. We introduce a dual-luminescent imaging to capture a global temperature distribution of supercooled water under the icing conditions. It consists of two-color luminescent probes and a multi-band filter. One of the probes is sensitive to the temperature and the other is independent of the temperature. The latter is used to cancel the temperature-independent luminescence of a temperature-dependent image caused by an uneven illumination and a camera location. The multi-band filter only selects the luminescent peaks of the probes to enhance the temperature sensitivity of the imaging system. By applying the system, the time-resolved temperature information of a supercooled-water droplet is captured.

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Date submitted: 07 Aug 2012

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