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Temperature distribution of a water droplet moving on a heated super-hydrophobic surface under the icing condition MASAFUMI YAMAZAKI, YUTAKA SUMINO, Tokyo Univ of Science, Katsushika, KATSUAKI MORITA, Japan Aerospace Exploration Agency — In the aviation industry, ice accretion on the airfoil has been a hazardous issue since it greatly declines the aerodynamic performance. Electric heaters and bleed air, which utilizes a part of gas emissions from engines, are used to prevent the icing. Nowadays, a new de-icing system combining electric heaters and super hydrophobic coatings have been developed to reduce the energy consumption. In the system, the heating temperature and the coating area need to be adjusted. Otherwise, the heater excessively consumes energy when it is set too high and when the coating area is not properly located, water droplets which are once dissolved possibly adhere again to the rear part of the airfoil as runback ice. In order to deal with these problems, the physical phenomena of water droplets on the hydrophobic surface demand to be figured out. However, not many investigations focused on the behavior of droplets under the icing condition have been conducted. In this research, the temperature profiling of the rolling droplet on a heated super-hydrophobic surface is experimentally observed by the dual luminescent imaging.

Masafumi Yamazaki
Tokyo Univ of Science, Katsushika

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