

Abstract Submitted
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An Experimental Investigation on Bio-inspired Icephobic Coatings for Aircraft Icing Mitigation¹ HUI HU, HAIXING LI, RYE WALDMAN, Iowa State University — By leveraging the Icing Research Tunnel available at Iowa State University (ISU-IRT), a series of experimental investigations were conducted to elucidate the underlying physics pertinent to aircraft icing phenomena. A suite of advanced flow diagnostic techniques, which include high-speed photographic imaging, digital image projection (DIP), and infrared (IR) imaging thermometry, were developed and applied to quantify the transient behavior of water droplet impingement, wind-driven surface water runback, unsteady heat transfer and dynamic ice accretion process over the surfaces of airfoil/wing models. The icephobic performance of various bio-inspired superhydrophobic coatings were evaluated quantitatively at different icing conditions. The findings derived from the icing physics studies can be used to improve current icing accretion models for more accurate prediction of ice formation and accretion on aircraft wings and to develop effective anti-/de-icing strategies for safer and more efficient operation of aircraft in cold weather.

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Hui Hu
Iowa State University

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