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Performance and Durability Tests of Smart Icephobic Coatings to Reduce Ice Adhesion

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The accretion of ice can damage applications ranging from power lines and shipping decks; to wind turbines and rail infrastructure. In particular on aircraft, it can change aerodynamic characteristics, greatly affecting the flight safety. Commercial aircraft are therefore required to be equipped with de-icing devices, such as heating mats over the wings. The application of icephobic coatings near the leading edge of a wing can in theory reduce the high power requirements of heating mats, which melt ice that forms there. Such coatings are effective in preventing the accretion of runback ice, formed from airborne supercooled droplets, or the water that the heating mats generate as it is sheared back over the wing's upper surface. However, the durability and the practicality of applying them over a large wing surface have been prohibitive factors in deploying this technology so far.