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Reducing ice adhesion via in-situ electrolysis HENRI-LOUIS GIRARD, SRINIVAS SUBRAMANYAN, HA EUN DAVID KHANG, YANG SHAO-HORN, KRIPA VARANASI, MIT — The formation of ice on solid substrate is the cause of numerous problems such as loss of shape of airfoils, weight increase of structures, heat transfer through roofs, slipperiness of surfaces, and more. Current de-icing technologies such as resistive heating, mechanical fracturing, or chemical spraying are either energy intensive or environmentally problematic. The use of super-hydrophobic surfaces to mitigate ice adhesion has been explored and shown to lead to significant reductions in the adhesion strength of ice as long as the texture was not penetrated by the ice. Unfortunately, cold surfaces exposed to humid environments are subject to frost formation which fills the defects and reduces the performance of these substrates. Here, we demonstrate the use of water electrolysis as a means to create stress-concentrators within the ice-solid interface *in situ*. This study investigates the capture of bubbles at the ice-solid interface and the effect of these bubbles on the adhesion of ice on the surface.

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