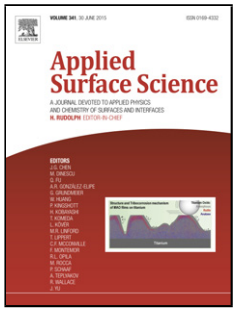

Title: Ice repellency behaviour of superhydrophobic surfaces: Effects of atmospheric icing conditions and surface roughness

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Ice repellency behaviour of superhydrophobic surfaces : Effects of atmospheric icing conditions and surface roughness

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Highlights

- A novel view on ice repellency of superhydrophobic surfaces in terms of contact angle hysteresis, roughness and icing condition has been discussed.
- This study is the first to deal with the effect of icing parameters on the ice repellency behaviour of superhydrophobic surfaces.
- Two fabricated superhydrophobic surfaces with similar wettability behaviour showed different icephobic behaviour
- Superhydrophobic surfaces are not always icephobic and ice repellency is governed by icing condition parameters like liquid water content and water droplet size.
- Lower liquid water content and smaller water droplet size promote ice-repellency behaviour of superhydrophobic surfaces.

Abstract

This paper presents a novel view on ice repellency of superhydrophobic surfaces in terms of contact angle hysteresis, surface roughness and icing condition. Ice repellency performance of two superhydrophobic silicone rubber nanocomposite surfaces prepared via spin coating and spray coating methods were investigated. High contact angle (>150°), low contact angle hysteresis (<6°) and roll-off property were found for both spin and spray coated samples. The results showed a significant reduction of ice adhesion strength on the spin-coated sample while ice adhesion strength on the spray-coated sample was found to be unexpectedly similar to that of the uncoated sample. Indeed, this research study showed that the icephobic properties of a surface are not directly