

# Correlation between room temperature characteristics and ice adhesion

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Ice adhesion strength is dependent on the surface properties, and surface wettability is often correlated with ice adhesion strength. However, these established correlations are limited to high ice adhesion and become invalid when the ice adhesion strength is low. In this work we carried out an experimental study to explore the relationships between low ice adhesion strength and room temperature surface properties [1]. A variety of room temperature properties of hydrophilic and hydrophobic samples consisting of both low and high ice adhesion surfaces were analysed. The properties investigated include water adhesion force, water wettability, roughness, elastic modulus and hardness. Our results show that low ice adhesion strength does not correlate well with water contact angle and its variants, surface roughness and hardness. Low elastic modulus does not guarantee low ice adhesion though surfaces with low ice adhesion always show low elastic modulus. Low ice adhesion (below 60 kPa) of tested surfaces may be determinative of small water adhesion force (from 180 to 270  $\mu$ N). Therefore, measurement of water adhesion force may provide an effective strategy for screening anti-icing or icephobic surfaces, and surfaces within specific values of water adhesion force will possibly lead to a low ice adhesion.

Reference:

- [1] Zhiwei He, Elisabeth T. Vågenes, Chrisrosemarie Delabahan, Jianying He & Zhiliang Zhang, Room Temperature Characteristics of Polymer-Based Low Ice Adhesion Surfaces, *Scientific Reports* (2017) 7:42181.