

Abstract Submitted
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Effectively trapping air or liquid water for anti-icing applications

JIANJUN WANG, Institute of Chemistry, Chinese Academy of Sciences — Icing on solid surfaces leads to operational difficulties and high maintenance efforts for power networks, aircrafts, ships, ground transportation vehicles and house-hold refrigerators, to name but a few. In extreme cases, icing on surfaces causes disastrous events such as crash of aircrafts and collapse of power networks, which result in severe economic impact and large loss of life. This talk is focused on the fundamentals of the ice formation and adhesion of ice with solid substrates aiming for fighting against icing on solid surfaces. When the supercooling is low, it would be possible to remove supercooled liquid water from the solid surfaces before freezing occurs. To achieve this, we design and constructed surfaces that can trap the air at the subfreezing temperature thus condensed water microdroplets could be spontaneously removed after the coalescence. When the supercooling is high, icing on surfaces occurs spontaneously. In this case, we constructed coatings on which aqueous lubricating layer could be trapped, thus the ice adhesion on the coating is so low that the ice formed atop could be removed by a wind action or its own gravity.

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