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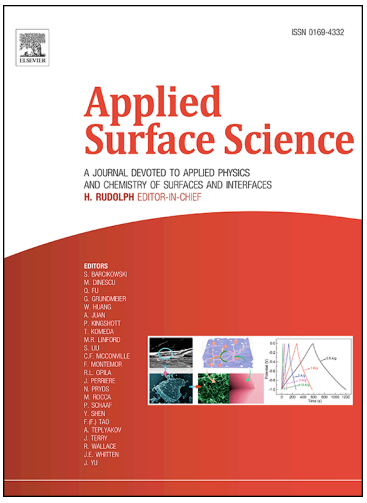


Full Length Article

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# The Verification of Icephobic Performance on Biomimetic Superhydrophobic Surfaces and the Effect of Wettability and Surface Energy

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**Abstract:**

The fundamental understanding of the icephobic performance of two model superhydrophobic surfaces (lotus and petal surfaces) is important for many industrial applications. The effect of wettability and surface energy on ice adhesion has recently received attention. However, the verification of icephobicity is typically carried out with a single observation method. For this study, rough modified rod-coated surfaces, structured polymer surfaces and nine smooth surfaces with tunable wettability were fabricated. Combining several observation techniques of icephobicity indicate that petal and lotus surfaces lose their superhydrophobicity, being less useful for ice repellency due to poor humidity tolerance in condensation conditions. The ice adhesion of rough surfaces enhanced with increasing hydrophobicity. The increased interface area leads to a reduction of the icephobic performance. The stress concentrator on the lotus surface was better than on the petal surface. In addition, the role of dynamic wettability on ice adhesion was checked. Smooth hydrophobic surfaces were found to be better icephobic materials compared to rough surfaces. The intrinsic surface energy of smooth