

Abstract Submitted  
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**Keeping a surface ice/frost free with electro-conducting water-repellent coatings**<sup>1</sup> ARINDAM DAS, SHREYAS KAPATRAL, CONSTANTINE M. MEGARIDIS, Mechanical and Industrial Engineering, University of Illinois at Chicago — Ice/frost formation on aircraft, wind turbines, power grids, marine vessels, telecommunication devices, etc. has propelled scientific research on surfaces that facilitate the removal of the water solid phase or retard its formation. Superhydrophobic, self-cleaning surfaces have been investigated recently (Jung et al., Langmuir 2011) for their passive anti-icing properties. Although superhydrophobic surfaces have been shown to delay the onset of frosting and icing, they cannot prevent it entirely. Hence active deicing/defrosting approaches are required to keep surfaces free of ice/frost. Defrosting experiments have been carried out on glass substrates coated with textured polymeric nanocomposite films of different surface wettability, porosity and roughness. A strong influence of these parameters on condensation, condensation frosting and defrosting was observed. The coatings are electro-conducting, thus allowing skin heating at the interface between ice and the substrate. Sustained ice- and frost-free operation is demonstrated at substrate temperatures well below the freezing point and in humid ambient atmospheres.

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Constantine Megaridis  
Mechanical and Industrial Engineering, University of Illinois at Chicago

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