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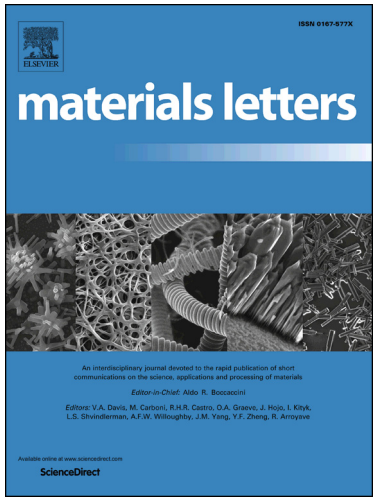

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The anti-icing/frosting aluminum surface with hydrangea-like micro/nano structure prepared by chemical etching

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Abstract: Icing on aluminum conductors might cause failure of transmission lines. Much work has been done to study the issue. In this study, superhydrophobic surface with hydrangea-like micro/nano structure on aluminum was successfully prepared by ultrasonic chemical etching in combination with boiling. The wettability of the as-prepared surface was analyzed, the contact angle of the surface was 161.37° as well as the sliding angle was less than 1°.The as-prepared surface could greatly prolong the time of icing and frosting even in low temperature, for the structure induced lots of micro/nano air bags. They could certainly reduce the heat transferring between the solid surface and water. Moreover, the as-prepared surface demonstrated good stability under the continuous corrosion of simulated acid rain, remained superhydrophobicity after 7-days corrosion.

Keywords: Superhydrophobic, Aluminum, Surfaces, Microstructure, Anti-icing/frosting property

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1. Introduction:

Aluminium conductors steel-reinforced(ACSR) are widely used in transmission lines nowadays. However, failure of aluminum conductors could be caused by icing in freezing weather. Over the past decade, the icing problem for transmission lines has been taken seriously both by academics and industry researchers. Much work has been done to improve the anti-icing property of insulator[1, 2], yet aluminum