

## Accepted Manuscript

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

Yang Wenxuan, Yuan Yuan, Liu Guoyong, Zhang Bing, Yang Rongkai

PII: S0167-577X(18)30703-1  
DOI: <https://doi.org/10.1016/j.matlet.2018.04.100>  
Reference: MLBLUE 24267

To appear in: *Materials Letters*

Received Date: 27 March 2018  
Revised Date: 17 April 2018  
Accepted Date: 25 April 2018

Please cite this article as: Y. Wenxuan, Y. Yuan, L. Guoyong, Z. Bing, Y. Rongkai, The anti-icing/frosting aluminum surface with hydrangea-like micro/nano structure prepared by chemical etching, *Materials Letters* (2018), doi: <https://doi.org/10.1016/j.matlet.2018.04.100>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



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

Yang Wenxuan <sup>a</sup>, Yuan Yuan <sup>a,\*</sup>, Liu Guoyong <sup>a</sup>, Zhang Bing <sup>b</sup>, Yang Rongkai <sup>b</sup>,

<sup>a</sup> College of Material Science and Engineering, Chongqing University, Chongqing 400044, China

<sup>b</sup> NARI Group Corporation (State Grid Electric Power Research Institute), Nanjing 210000, China

**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  $161.37^\circ$  as well as the sliding angle was less than  $1^\circ$ . 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

\* Corresponding author. Tel.: +86 13708396917;

E-mail address: yuany@cqu.edu.cn (Yuan Yuan).

## 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

Download English Version:

<https://daneshyari.com/en/article/8012731>

Download Persian Version:

<https://daneshyari.com/article/8012731>

[Daneshyari.com](https://daneshyari.com)