

## Accepted Manuscript

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PII: S0169-4332(13)01810-2  
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2013.09.146>  
Reference: APSUSC 26429

To appear in: *APSUSC*

Received date: 1-8-2013  
Revised date: 23-9-2013  
Accepted date: 24-9-2013

Please cite this article as: X. Zhang, Y. Guo, Y. Liu, X. Yang, J. Pan, P. Zhang, Facile fabrication of superhydrophobic surface with nanowire structures on nickel foil, *Applied Surface Science* (2013), <http://dx.doi.org/10.1016/j.apsusc.2013.09.146>

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# Facile fabrication of superhydrophobic surface with nanowire structures on nickel foil

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**Abstract:** A simple solution immersion method was developed for the preparation of superhydrophobic surface with nanowire structures on magnetic nickel substrate. The morphology feature, chemical composition and superhydrophobicity of the resultant surface were analyzed by means of scanning electron microscopy, x-ray powder diffraction, x-ray photoelectron spectrum and water contact angle measurements, respectively. The surface wettability could be easily changed from superhydrophilic to superhydrophobic by a simple chemical modification with stearic acid. It is confirmed that the synergic effect of the surface microstructure and surface free energy contribute to the unique water repellence. Interestingly, the superhydrophobic nickel foil can be used to fabricate a miniature magnetic boat with a controlled movement on water surface.

**Keywords:** Nanomaterials; Microstructure; Surface; Nickel

## 1. Introduction

Superhydrophobic surface has drawn a lot of interests in both academia and industry because of their applications as corrosion protective coatings, antifogging, enhancing buoyancy, and for many other purposes [1-3]. Superhydrophobicity will be achieved not only from the surface chemical composition of but also from the surface morphology or roughness [4-5]. For hydrophobic materials, roughing in certain ways directly leads to superhydrophobicity [6]. On the contrary, for intrinsically hydrophilic substrates such as metal and metal alloys, superhydrophobicity can only be obtained by a combination of rough surface morphology and subsequent hydrophobic modification [7]. In order to

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