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Super-hydrophobic nickel-cobalt alloy coating with micro-nano flower-like structure

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Abstract

A simple electrodeposition process was proposed to fabricate super-hydrophobic nickel-cobalt alloy coating without modification by low free energy materials. In this paper, the correlation between wettability and surface characteristics has been investigated. Scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), confocal profilometry and optical tension measurements were used to characterize the micro-structure and wettability properties of the coatings. The results showed that surface morphology, surface roughness and surface energy play critical roles for the wettability of the coatings. The surface of freshly prepared Ni-Co alloy coatings was highly hydrophilic with a water contact angle of 0°. Meanwhile, after being exposed to air for two weeks, surface of the coatings fabricated by one and two electrodeposition steps became super-hydrophobic with water contact angles of 158º and 163º, respectively. This