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# Development of super-hydrophobic surface on Al 6061 by anodizing and the evaluation of its corrosion behavior

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## Abstract

In the present work, super-hydrophobic surface on 6061 aluminum alloy (Al) was fabricated by single-step anodizing and modified by low surface energy materials. This process is a straightforward method which can also be applied at large scales. The effect of anodizing voltage changes on the surface morphology and the wettability of surfaces was also investigated. The uniform roughness on anodic aluminum oxide (AAO) which was fabricated by single-step anodizing and chemically modified by stearic acid (STA) had super-hydrophobic properties. The treatment before and after anodizing process played a significant role in bonding STA onto AAO surfaces. According to the contact angle obtained from AAO and anodic aluminum oxide modified by STA, which were less than  $20^{\circ}$  and  $152 \pm 0.3^{\circ}$ , respectively, their wettability and surface energy were examined. Moreover, the corrosion resistance of the super-hydrophobic surface was tested by Tafel polarization and electrochemical impedance spectroscopy (EIS) tests. The results showed that the inhibition efficiency ( $\eta$ ) of AAO surface compared to super-hydrophobic surface increased from 58% to 97% which is an indication of excellent corrosion resistance of these coatings.

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