Effect of bis-(3-triethoxysilylpropyl)-tetrasulfide on Super-Hydrophobicity and Corrosion Resistance of Self-Assembled Monolayers on 6061 Aluminum Alloys

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The super-hydrophobic self-assembled monolayers (SAMs) were prepared by self-assembled and etching method on 6061 aluminum alloys. Its wettability, morphology, and chemical composition of SAMs were investigated by contact angle (CA), field-emission scanning electron microscopy (FE-SEM), Fourier transform infrared spectroscopy (FTIR), X-ray photoelectron spectroscopy (XPS), and energy dispersive spectroscopy (EDS). The corrosion resistances of SAMs were studied by potentiometric polarization and AC impedance in 3.5 wt.% NaCl solution. The result indicated that self-assembled film had super-hydrophobic properties when bis-(3-triethoxysilylpropyl)-tetrasulfide (BTESPT) volume was 0.10mol/L. Electrochemical properties testing showed that the film had better corrosion resistance, in which the corrosion current density was maintain $1.140 \times 10^{-7} \text{ A/cm}^2$ and AC impedance reached $2.30 \times 10^5 \Omega \cdot \text{cm}^2$. Therefore, the film has both superhydrophobic and corrosion resistance characteristics.

Keywords: Aluminum alloy, Super-hydrophobicity, Self-assembled, Corrosion resistance

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