

# DIOCTYL SULFOSUCCINATE SODIUM SALT (AOT) AS A CORROSION INHIBITOR FOR AZ31 MG ALLOY AND MODIFYING AGENT FOR LAYERED DOUBLE HYDROXIDE (LDH)

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Surfactants can be used as a corrosion inhibitor for metallic substrates such as magnesium (Mg) alloys. This study examines the corrosion inhibition properties of dioctyl sulfosuccinate sodium salt (AOT) on AZ31 Mg alloy using electrochemical impedance spectroscopy (EIS). Surface characterization is carried out using scanning electron microscopy (SEM), energy-dispersive X-ray spectroscopy (EDS), X-ray diffraction (XRD), and X-ray photoelectron spectroscopy (XPS). Density Functional Theory (DFT) calculations were also performed and showed an interaction energy of -5.25 eV between AOT and the substrate, validating the effectiveness of AOT in corrosion inhibition by being adsorbed on the surface of substrate. Additionally, AOT was incorporated into the layered double hydroxide (LDH) conversion coating which was formed on the AZ31 Mg alloy. SEM images and XRD tests confirm the existence of the LDH layer after immersion in the saturated AOT solution. Furthermore, the addition of AOT increases the inner layer thickness of the LDH from  $11.8 \pm 0.2 \mu\text{m}$  to  $16.3 \pm 0.3 \mu\text{m}$ , significantly improving the corrosion resistance of the substrate. These findings underscore the potential of AOT as a corrosion inhibitor. Moreover, The modification of LDH with AOT could enhance the corrosion resistance of the substrate, which can be used as a surface pretreatment for further application of organic coatings.

**Keywords:** Dioctyl sulfosuccinate sodium salt, AOT, AZ31 magnesium alloy, corrosion inhibitor, corrosion resistance, conversion coating, layered double hydroxide, LDH

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