Inhibition of AA 2024-T3 Corrosion in Alkaline NaCl Solution by Compound Sodium Dodecylbenzenesulfonate and Cerium Chloride

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doi: 10.20964/2017.12.58

Received: 1 July 2017 / Accepted: 29 September 2017 / Published: 12 November 2017

The synergic corrosion inhibition of AA 2024-T3 by sodium dodecylbenzenesulfonate and cerium chloride in 0.01 mol/L NaCl solution (pH 10) was studied by potentiodynamic polarization, XPS, EDS and SEM. In presence of 0.1 g/L CeCl_3 + 0.28 g/L SDBS inhibitors, both the general corrosion and pitting corrosion were effectively inhibited. A compound inhibition film including the oxides and hydroxides of aluminum and cerium, the organic rare earth compound $\text{Ce}(\text{DBS})_3$ and the corrosion product $\text{Al}(\text{DBS})_3$ were formed on the surface, which provided good corrosion protection to the AA substrate. As the immersion time was extended, the passive state remained stable while the inhibition effect for pitting corrosion decreased to some extent due to the formation of pits around the Cu-rich phases, induced by the galvanic effect between the Cu-rich phases and the aluminum substrate.

Keywords: AA 2024-T3; Inhibition; SDBS; CeCl_3 ; Pitting corrosion

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