

## **Characterization of the inhibition effect of CaSO<sub>4</sub> on pitting damage accumulation of aluminum alloy 7075-T6.**

Pitichon Klomjit, Prof. R. G. Buchheit  
Fontana Corrosion Center, The Ohio State University  
Email address: [klomjit.2@osu.edu](mailto:klomjit.2@osu.edu)  
Telephone :+1 847 804 3292  
2041 N. College Rd  
Columbus, OH 43210

Aluminum alloy 7075-T6 is widely used in aerospace application due to its high strength to weight ratio, but this material is susceptible to corrosion, which can lead to catastrophic failure when it is used in the field. Due to its toxicity of chromate, non-chromate inhibitors have been developed to replace chromates for corrosion protection. CaSO<sub>4</sub> is sometimes found as a component in primer pigment systems, but its role is not well described in the scientific literature. Therefore, the goal of this study is to isolate and characterize the inhibition effect of CaSO<sub>4</sub> on aluminum alloy 7075-T6. Samples of AA7075-T6 were exposed to different pH chloride solution by static immersion exposure for times ranging up to 30 days. The solution pH was varied from 3 to 10 and the chloride concentration was fixed at 100 mM. Pitting corrosion damage was characterized by optical profilometry (OP) to find pit depth, volume, and area-equivalent pit mouth diameter. Electrochemical methods were also used to characterize corrosion inhibition. Preliminary results show that under acidic condition, CaSO<sub>4</sub> suppresses pitting. The surface looks shiny after 30 day exposure and the OP images suggest fewer and shallower pits. Polarization curves do not show a sign of inhibition, but electrochemical impedance spectroscopy with 5 mV perturbation shows some inhibition. The mechanism of suppressed localized corrosion is under investigation.