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## Effect of *Pseudomonas* sp. on the degradation of aluminum/epoxy coating in seawater

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### Abstract

Polymeric coatings prevent metal materials from corrosion. Nevertheless, the degradation of the coatings in seawater by microorganisms is almost unknown. In this work, we explored the degradation of the aluminum/epoxy coating in sterile seawater and seawater inoculated with *Pseudomonas* sp. by electrochemical impedance spectroscopy, scanning electron microscopy, energy dispersive spectroscopy, Fourier transform infrared spectroscopy and contact angle test. The decreases in the corrosion resistance of the coating were significantly higher in seawater inoculated with *Pseudomonas* sp. than in sterile seawater. The mature biofilm formed on the coating and then the extensive under-coating corrosion occurred in seawater inoculated with *Pseudomonas* sp.. These results revealed that *Pseudomonas* sp. significantly decreased the corrosion resistance of the coating and might degrade the coating. Some bulges and tiny holes were observed on the coating in seawater inoculated with *Pseudomonas* sp.. The contents of Al and O significantly respectively decreased and increased on the surface of the coating in seawater inoculated with *Pseudomonas* sp. relative to those on the surfaces of the coating without immersion and in sterile seawater. The absorbance of the C-OH peak for the coating immersed in seawater inoculated with *Pseudomonas* sp. was significantly higher than that for the coating without immersion and the coating immersed in sterile seawater. Moreover, *Pseudomonas* sp. decreased the water contact angle of the coating surfaces. The results demonstrated that *Pseudomonas* sp. degraded the aluminum/epoxy coating through decomposing the aluminum and oxidizing the epoxy to forming hydroxyl.

**Keywords:** *Pseudomonas* sp.; degradation; aluminum/epoxy coating; seawater.

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