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“New Aluminum Sacrificial Anode Chemistries”

Abstract
Zn or Al-Zn-In alloys have been used as standard sacrificial anodes. In order to reduce stress corrosion cracking (SCC) or hydrogen embrittlement of high strength steels, a low-voltage Al-Ga alloy is also used by the US Navy. An alternative low-voltage Al-Zn-Bi alloy has also been recently suggested. Our research has focused on developing a better understanding of the main effects and interactions of both active and impurity elements including Zn, Bi, Ga, and In. Potentiostatic, open circuit, and tafel tests have been run on aluminum alloy samples cast at the VT foundry. Selected samples have also been examined under SEM. The addition of In and Ga have major effects on open circuit potential (E), corrosion potential (ECORR), and current density (J). Initial results indicate that Zn affects E and J but has little effect on ECORR. The addition of Bi affects ECORR, but seems to have little effect on EVSC and J.

Bio
Jacob Monzel received his B.S. in Materials Science and Engineering from Virginia Tech in 2011. He is currently pursuing both a M.S and a PhD under Dr. Alan Druschitz. He also works part time for Theta Tech Solutions assisting aerospace design and various materials projects. Research interests include metals, ceramics, and composites.