

## **Electrochemical Characteristics of Corrosion Films on Al-Cu Alloys**

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Electrochemical studies have revealed relationships between the composition of Al-Cu alloys and corrosion properties including corrosion rates, repassivation rates, and pitting potentials. While the details of these relationships vary with environmental conditions, the electrochemical data, particularly when analyzed in the context of surface analysis results, indicate that the oxide films formed on Al-Cu alloys during corrosion strongly influence the further corrosion of the underlying metal. For example, under some circumstance, particles of metallic Cu form in the oxide and act as cathodic sites by galvanically coupling with the alloy substrate. In addition, Cu may partly oxidize and effectively dope the aluminum oxide altering the dielectric properties of the normally passive film. The role of Cu on the defect structure of the film as it relates to pitting phenomena is also under study. Results of collaborative work between the Pacific Northwest National Laboratory and Ohio State University will be presented to illustrate the importance of fully characterizing composition and properties of corrosion films formed on Cu-bearing Al alloys in order to explain localized corrosion processes in these materials.

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