

Corrosion Properties of Friction Welded Dissimilar Aluminum Alloys; Duralumin and AA6063

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Abstract : With the increased needs for lightweight materials in automobile industry, the usage of aluminum alloys becomes prevailed as components and car bodies due to their comparative specific strength. These parts composed of different aluminum alloys should be connected each other, where welding technologies are commonly applied. Among various welding methods, friction welding method as a solid state welding gets to be popular in joining aluminum alloys as it does not produce a defect such as blowhole that is often formed during typical welding processes. Once two metals are joined, corrosion would become an issue due to different electrochemical potentials. In this study, we investigated variations of corrosion properties when Duralumin and AA6063 were joined by friction welding. From the polarization test, it was found that the potential of the welded was placed between those of two original metals, which could be explained by a concept of mixed potential. Pitting is a common form as a result of the corrosion of aluminum alloys when they are exposed to 3.5 wt% NaCl solution. However, when two different aluminum alloys (Duralumin and AA6063) were joined, pitting corrosion occurred severely and uniformly in Duralumin while there were a few pits around precipitates in AA6063, indicating that AA6063 was cathodically protected.

Keywords : corrosion properties, friction welding, dissimilar Al alloys, polarization test

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