

Fabrication of Salt-Friendly Corrosion-Resistant Aluminum Alloys

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Summary

The formation behaviors of the anodic oxide film that forms on various commercially available aluminum alloys were investigated by galvanostatic anodizing in etidronic acid, and their corrosion resistances were examined in a 3.5 wt% NaCl solution. A1050, A5052, and A7075 aluminum alloys were galvanostatically anodized in an etidronic acid solution. An amorphous porous oxide film formed on the A1050 alloy and the A5052 alloy, whereas a plasma electrolytic oxidation (PEO) film formed on the A7075 alloy. The nanopores formed in the porous oxide film could be sealed with hydroxides by immersion in boiling water. Although the corrosion current increased due to the presence of alloying elements in the matrix, the fabrication of the corrosion-resistant A1050 and A5052 alloys could also be achieved by anodizing. Alternately, the corrosion resistance of the A7075 alloy covered with the PEO film was low due to its open microporous structure.