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Novel eco-friendly surface treatment for the AA5XXX and AA6XXX alloys joined by welding for adhesion improvement and corrosion protection.

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Abstract

Global climate change has led to increasing efforts to reduce fossil fuel consumption. In this sense enormous efforts, both in industry and academia, have been made to the weight reduction of vehicles, due to the direct correlation with the fuel consumption rate. The favorable properties of Al, such as lightweight, high strength, and good combination of strength and formability make Aluminum alloys an excellent choice for weight reduction. However, they are susceptible to localized corrosion and this can be a major threat to the safe use in components. Consequently, surface protection of aluminum alloys against corrosion is a core issue in these applications, and efforts are being made to find suitable alternatives for replacing toxic components in surface treatment solutions. In this work, an eco-friendly surface treatment alternative to conventional anodization was studied and applied on the AA5XXX and AA6XXX alloys joined by welding, for corrosion protection. The corrosion

resistance evaluation of the modified surfaces was evaluated by electrochemical techniques, salt spray test, and microscopy. The results pointed out that the eco-friendly alternative to conventional anodization tested for corrosion protection of new AA5XXX and AA6XXX alloys joined by welding was a potential treatment to replace treatments that generate toxic residues to the environment.