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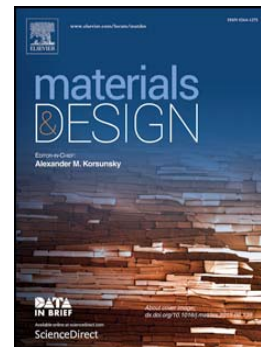
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Surface characteristics and adhesive strength to polyetheretherketone of titanium electrografted with aryl diazonium salt

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Abstract

In this study, diazonium tetrafluoroborate was electrografted on the surface of titanium (Ti) via covalent bonding to improve the adhesive durability between polyetheretherketone (PEEK) and Ti, existing as the titanium and carbon fiber reinforced polyetheretherketone (Ti/C_f/PEEK) laminates. The electrochemical reduction of 4-nitrobenzenediazonium in aqueous acidic solution was conducted by the cyclic voltammetry method. Subsequently, X-ray photoelectron spectroscopy, scanning electron microscopy, Fourier transform infrared spectroscopy, and contact angle measurements were used to detect the change in the Ti surface, confirming the presence of aryl layer. Moreover, the single lap shear test was used to investigate the adhesion between PEEK and Ti with and without an aryl layer. The residual strength of these joints after the treatment at 82°C and 95% relative humidity was also investigated. The results show that the interface bond strength in the presence of an aryl layer was much higher than that without an aryl layer.

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