Enhanced Corrosion Resistance of Silicone-Modified Epoxy Coatings by Surface-Wave Plasma Treatment

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Silicone-modified epoxy coatings were prepared and treated under different plasma atmospheres in order to enhance their anticorrosion ability. The corrosion current density, corrosion potential and impedance of the modified coatings were measured by an electrochemical workstation. The results showed that the corrosion resistances of silicone-modified epoxy coatings were highly improved by surface-wave plasma treatment. Compared with the original coating, the corrosion current density of these coatings modified by plasma decreased from 0.5976 $\mu\text{A}/\text{cm}^2$ to the minimum of 0.0058 $\mu\text{A}/\text{cm}^2$ and the impedance increased from $1.925 \times 10^3 \Omega \cdot \text{cm}^2$ to the maximum of $2.938 \times 10^6 \Omega \cdot \text{cm}^2$, in which Ar plasma showed the best significant effect.

Keywords: silicone-modified epoxy, surface wave plasma, surface modification, corrosion resistance

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