A Mechanistic Study of Corrosion of Graphene and Low zinc-rich Epoxy Coatings on Carbon Steel in Salt Environment

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The effect of graphene on zinc-rich epoxy coating comprised of 40 wt % Zn has been studied. The potential-time measurement, electrochemical impedance spectroscopy (EIS), salt spray fog and UV-aging cyclic aging test and scanning electron microscopy (SEM) were used to characterize the protection performance of coatings. The results show that the zinc-rich epoxy coating reinforced with 2.0 wt% graphene has greatly improved the corrosion protection of coating. Also, the permeability of zinc-rich epoxy coating can be improved by adding adequate amounts of graphene. Graphene nanosheets could enhance the conductivity of zinc particles by introducing the graphene into zinc-rich epoxy coatings and improved the utilization of zinc powders, finally, the life of zinc-rich epoxy coating was prolonged.

Keywords: Zinc-rich epoxy; Graphene sheets; Corrosion protection

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