Failure Behavior and Damage Mechanism of Acrylic Polyurethane Coating in Tropical Marine Atmospheric Environment

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Acrylic polyurethane coating was exposed to the tropical marine atmospheric environment for 24 months, and the physical, chemical and protective properties of the coating were investigated. The results demonstrated that the appearance, adhesion and protective property of the coating were degraded rapidly in the early exposure stage, and then changed slowly in the late exposure stage. During the field exposure test, the ultraviolet irradiation was a major contributor to polyurethane chain scission of the coating, and the chain scission was mainly characterized by the rupture of C-N bonds. Moreover, the thermal stability of the coating was less affected by the tropical marine atmospheric environment.

Keywords: marine atmosphere; acrylic polyurethane coating; physical changes; chemical structures; EIS

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