

Apparent Ageing Mechanism of Polyurethane Coating in Typical Atmospheric Environment

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Abstract : Outdoor exposure experiments were conducted in three extreme environments, namely the Chinese plateau mountain environment (Lhasa), the cold-temperate environment (Mohe), and the marine atmospheric environment (Wanning), to track a new long-life environment-friendly polyurethane coating. The relationship between apparent properties, namely gloss and microstructural changes, was analyzed, and the influence of typical climatic environment on the aging mechanism of polyurethane coatings was discussed. Results show that the UV radiation in the Lhasa area causes photoaging degradation, micropores are formed on the coating surface, and the powdering phenomenon is obvious. Photodegradation occurs in the Wanning area, and a hydrolysis reaction is observed. The hydrolysis reaction catalyzes the photoaging, the coating surface becomes yellow, and the powdering becomes serious. Photoaging is also present in the Mohe area, but it is mainly due to temperature changes that in turn change the internal stress of the coating. Microcracks and bumps form on the coating surface.

Keywords : aging, atmospheric environment, outdoor exposure, polyurethane coating

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