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Review Article

Study of Various Epoxy-Based Surface Coating Techniques for Anticorrosion Properties

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Polyepoxides are a kind of chemical polymerization that is widely employed in several industrial purposes. Due to their macromolecular structure, polyepoxides offer superior superficial treatment and antierosion activity compared to basic organic corrosion inhibitors. During metal-inhibitor interactions, the polyepoxides outlying glacial efficient clusters operate as adsorption centers. Numerous polyepoxides have been employed as anticorrosive coating materials in both pure and cured forms, most notably for ferrite in acidic and NaOH solutions. The majority of polyepoxides operate as inhibitors of interface and mixed-type corrosion. Numerous computer models have been done to illustrate the anticorrosive properties of polyepoxides on metallic shells and their adsorption behavior. However, because the majority of polyepoxides have low solubility, they are best used as anticorrosive coating materials. Numerous polyepoxides-based coatings have been created and effectively applied on ferrite and aluminum in salt-water solution according to a review of the literature. Natural and synthetic additives can be used to further enhance the anticorrosive properties of polyepoxides coatings. This review article compiles published findings on the anticorrosive properties of pure and cured polyepoxides for a variety of metals and alloys in a variety of electrolytes.

1. Introduction

A variety of industrial finishes, from pipeline protection to warehouse floor sealing, employ epoxy to preserve surfaces, reinforcing materials, and prevent corrosion and decay. As a result, epoxy is one of the most extensively used industrial finishes, with applications ranging from pipeline protection to warehouse floor sealing. Epoxy coatings are still more substantial than some other surface polymeric matrices at first, but their potential that provides long-lasting corrosion protection, adhesion, and adaptability to a wide variety of substrates ultimately makes them more cost-effective than other options [1–5]. Less frequently, coating materials may be reapplied when materials are properly prepared for coating application. The various epoxy resin and nanoparticles used in the different polymer matrix composite materials and resulted from reasonable improvements in various aspects [6–9]. Corrosive species cannot permeate or diffuse through the micropores in ER coatings because of the addition of additives. All published reports on the