Long Term Corrosion Protection of Epoxy Coating Containing Tetraaniline Nanofiber

Feng Yang¹, Tong Liu^{1,2}, Jingyu Li^{1,2}, Haichao Zhao^{2,*}

¹ Shenyang University of Chemistry and Technology, Shenyang, 110142, P. R. China

² Key Laboratory of Marine Materials and Related Technologies, Zhejiang Key Laboratory of Marine Materials and Protective Technologies, Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, P. R. China.

*E-mail: zhaohaichao@nimte.ac.cn

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A supermolecular assembly chemistry was applied to aniline based oligomer, tetraaniline (TANI), in 1 M HCl aqueous solution to obtain nanofibrous emeraldine salt of TANI (TANI-ES), making it suitable as novel anticorrosive inhibitor for primer coatings. Epoxy coating pigmented with 0.5 wt% and 1 wt% TANI-ES were then prepared by curing reaction of epoxy E44, polyamide hardener with the existence of TANI-ES. The corrosion behavior of the coatings without and with 0.5 wt% and 1.0 wt% TANI-ES on Q235 steel in the 3.5 wt% NaCl solution was investigated by open circuit potential (OCP) test, electrochemical impedance spectroscopy (EIS) measurements, scanning vibrating electrode technique (SVET) as well as salt spray test. Results suggested that synthesized epoxy composite coatings, particularly with 0.5 wt% TANI-ES nanofiber coating, exhibited exceptional anticorrosion capability compared with the pure epoxy E44 coating. The salt spray test exhibited that 0.5 wt% conducting polymer coating possessed excellent salt-fog-resistance property with slight rust formation and blistering resistance on the steel sheets.

Keywords: tetraaniline; nanofiber; epoxy coating; anticorrosion

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