
Amino modified graphene oxide to enhance the corrosion resistance of epoxy resin for metal protection

Jie Chen, Xin Li, Dongxia Huo, Ding Nan

College of Chemistry and Chemical Engineering, Inner Mongolia University, Hohhot, China

Presenter's e-mail address: cj_imu@163.com

Abstract Among the array of strategies deployed to combat corrosion, coating protection stands out as a method both simple and cost-effective. We employed paraphenylenediamine (PPDA) to modify graphene oxide (GO), yielding nanofillers with exceptional dispersibility and barrier properties within an epoxy resin matrix. By incorporating functionalized reduced graphene oxide (FRGO) into the epoxy matrix, we achieved a composite coating exhibiting remarkable corrosion resistance. Comprehensive analyses utilizing FTIR, Raman, XPS, and XRD revealed that PPDA was covalently grafted onto GO, significantly enhancing its lamellar structure while concurrently reducing its hydrophilicity. Furthermore, electrochemical impedance spectroscopy and accelerated salt spray corrosion tests demonstrated that the FRGO-EP composite exhibited superior corrosion resistance compared to both EP and conventional GO-EP. Additionally, we investigated the impact of FRGO content in the epoxy coating on its overall performance. Our findings offer novel insights and methodologies for advancing the research and application of GO in the domain of metal protection.

Keywords Graphene oxide, Paraphenylenediamine, Epoxy coating, Corrosion resistance

Reference

[1] Jie Chen, et al. *Diamond and Related Materials* (2024) 111425.