Fluorocarbon resin coating of G/SiO_2 in the Conservation of Iron Relics

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Abstract To address the issue of corrosion in iron relics, a six-group fluorocarbon protective coating was developed. This was achieved by synthesizing silica-composite graphene powder through hydrolysis, using fluorocarbon resin as the film-forming resin. Furthermore, we compounded Schiff's base with other potent corrosion inhibitor and fertan corrosion inhibitor to enhance the coating's protective capabilities. The prepared samples were characterized using scanning electron microscopy (SEM), infrared spectroscopy (FT-IR), and X-ray diffraction (XRD). Additionally, the coating was investigated by electrochemical alternating impedance spectroscopy (EIS). The findings indicate that the coating with Schiff base compounded with the corrosion inhibitor and G/SiO_2 as the filler demonstrates superior overall performance. Specifically, it exhibits grade one adhesion, an average film thickness exceeding 100 μm at a single application. The EIS results impressively demonstrated that the coating exhibited an impedance modulus of 6.51×10^{11} Ω·cm^2 at 0.01 Hz, following 7 d immersion period in a 3.5 wt% NaCl aqueous solution. This remarkable performance signifies the coating's exceptional resistance to electrochemical corrosion.

Keywords Conservation of Iron Cultural Relics, Graphene, SiO_2, Fluorocarbon, Schiff base, Corrosion

Reference

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