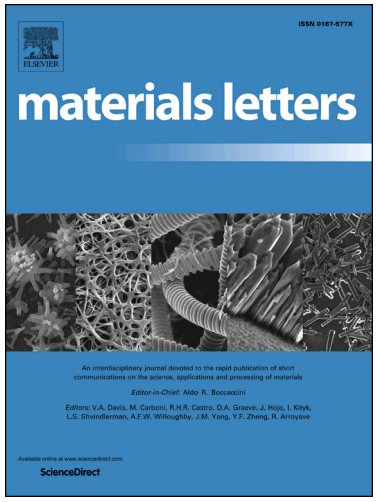

A Facile Method for the Modification of Graphene Nanosheets as Promising Anticorrosion Pigments

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A Facile Method for the Modification of Graphene Nanosheets as Promising Anticorrosion Pigments

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Abstract: A facile chemical vapor deposition (CVD) method was developed to modify graphene nanosheets with molecular-sized polydimethylsiloxane (PDMS-GNSs) in this work. Influences of the surface modification on microstructure and dispersibility of GNSs, as well as their performance as anticorrosion pigments, have been investigated. The experimental results showed that the morphology of PDMS-GNSs is similar to that of GNSs, the thickness of PDMS-GNSs increases 0.23 nm as compared to GNSs, and PDMS-GNSs exhibit a significantly enhanced dispersibility in common paint solvents and ability to reinforce the anticorrosion performance of epoxy coating. This method has wide application prospects in anticorrosion field.

Keywords: Graphene; Polydimethylsiloxane; Nanocomposites; Modification; Corrosion

1. Introduction

Graphene, a single layer of carbon atoms arranged in a two-dimensional honeycomb lattice, has been reported to be a promising material for anticorrosion due to its impermeability to any molecule and almost all the ions.[1-3] However, defect-free graphene has very inert surface properties due to the non-polar covalent double bonds, which weakens the interactions between graphene and polymer molecules.[4] Additionally, graphene is particularly prone to aggregate due to strong π–π interactions, hydrophobic interactions, and van der Waals forces.[5] Therefore, surface modification of graphene plays an important role in preparing graphene-based