

Graphene as an anticorrosion coating layer

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Graphene (Gr), the recently discovered allotrope of carbon, has unique properties principally attributed to its 2D hexagonal lattice structure. A single atomic layer of graphene exhibits excellent anticorrosive properties. This anticorrosive property of graphene can be explained by a combination of three processes. First, graphene coatings can make the path of permeating water more tortuous. Second, pristine graphene is impermeable to water. Third, the coatings act as an excellent barrier to water, oxygen and other corrosive materials.

In this study, corrosion of Iron was measured with a coating of Graphene using electrochemical methods. Graphene was prepared from natural graphite (30 μm) through Modified Hummers' method. Selected graphene samples were characterized by Infrared Spectroscopy (IR), X-ray Diffraction (XRD) and Scanning Electron Microscopy (SEM). Then it was mixed with Carboxymethyl Cellulose (CMC) in different ratios. Then, those samples were dissolved in the same amount of water to prepare a series of samples for coating. Top surface of the iron were coated by spraying at 250C⁰ to act as the working electrode. The corrosion rate was examined by electrochemical impedance spectroscopic (EIS) measurements and Tafel slope analysis. Both of the result shows that corrosion inhibition efficiency of the coated samples were 30.52 % and 39.26 % respectively in Coated mixture of Graphene with CMC at 3: 1 ratio.