Insitu electrochemical synthesis of Polyaniline/Graphene Nanocomposite Coatings for surface protection of mild steel

Madhan Kumar and Zuhair Mattoug Asad Gasem
Center of Research Excellence in Corrosion, King Fahd University of Petroleum and Minerals, Dharan, Saudi Arabia -31261

Due to chemically inert and high durability, graphene based materials as a corrosion protection coating have generated interest among researchers and makes new insight to develop anticorrosive coating layers on a metal substrate. In this current study, effective attempt of constructing nanocomposite comprised of polyaniline (PANI) and functionalized graphene oxides (GO) has been done for the purpose of corrosion protection of mild steel (MS). The synthesized nanocomposites were investigated in terms of morphology, chemical structure and thermal stability with scanning electron microscope (SEM), Attenuated total reflectance infrared (ATR-IR) and thermal gravimetric analysis (TGA) methods, respectively. SEM investigations evidenced uniform morphology in PANI/GO nanocomposites with nanometer-sized diameters. The corrosion performance was studied in 3.5% NaCl solution by electrochemical impedance spectroscopy and potentiodynamic measurements. The origin of such enhanced corrosion protection property is explained from view point that the interfacial interactions between functionalized GO and PANI matrix, greatly improves at the polymer/filler bond stability resulting in a better corrosion performance.