**ABSTRACT**

The use of natural fibers as reinforcing materials in thermoplastics and thermoset matrix composites provide optimistic environmental profits with regard to ultimate disposability and better use of raw materials. The present work is focused on the corrosion inhibition property of a polymer matrix composite produced by the use of groundnut shell (GNS) waste. Polyester (PE) was synthesized by condensation polymerization of symmetrical 1,3,4-oxadiazole and pimelic acid using sodium lauryl sulfate as surfactant. The polyester–groundnut shell composite (PEGNS) was prepared by ultrasonication method. The synthesized polyester–groundnut shell composite was characterized by FT-IR, TGA and XRD analysis. The corrosion inhibitory effect of PEGNS on mild steel in 1 M H2SO4 was investigated using gravimetric method, electrochemical impedance spectroscopy, potentiodynamic polarization, atomic absorption spectroscopy and scanning electron microscopy. The results showed that PEGNS inhibited mild steel corrosion in acid solution and indicated that the inhibition efficiency increased with increasing inhibitor concentration and decrease with increasing temperature. The composite inhibited the corrosion of mild steel through adsorption following the Langmuir adsorption isotherm. Changes in the impedance parameters Rt, Cdl, Icorr, Ecorr, ba and bc suggested the adsorption of PEGNS onto the mild steel surface, leading to the formation of protective film.